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SEPTEMBER, 1903.

	Tuesday	Normal School opens.
	Wednesday	
	Thursday	
	Friday	
5	Saturday	Meeting of Faculty of Medicine.
6	SUNDAY	
7	Monday	Meeting of Faculty of Applied Science.
8	Tuesday	
9	Wednesday	Matriculation, Exhibition, Scholarship, Supplemental Examinations, Arts.
10	Thursday	Examinations continued. Finance Committee.
11	Friday	Examinations continued.
12	Saturday	
13	SUNDAY	
14	Monday	Introductory Lecture in Law. Examinations continued. Register opens for students in Medicine.
15	Tuesday	Lectures in Law begin. Examinations in Arts continued. Supplemental Examinations, Applied Science.
16	Wednesday	Examinations continued.
17	Thursday	
18	Friday	Meeting of Governors.
19	Saturday	Exhibition Examinations, Applied Science.
20	SUNDAY	
21	Monday	Meeting of Faculty of Arts. College Grounds Committee. Examinations in Summer Reading, Applied Science. Engineering Building Committee. Chemistry and Mining Building Committee.
22	Tuesday	Introductory Lecture in Medicine. Lectures in Arts, and Applied Science begin. Meeting of Examiners.
23	Wednesday	Lectures in Medicine begin.
24	Thursday	
25	Friday	
26	Saturday	
27	SUNDAY	
28	Monday	
29	Tuesday	
30	Wednesday	

OCTOBER, 1903.

1	Thursday	Summer Essays in Applied Science to be sent in.
2	Friday	Meeting of Faculty of Arts.
3	Saturday	Meeting of Faculty of Medicine.
4	SUNDAY	
5	Monday	Meeting of Faculty of Applied Science.
6	Tuesday	Founder's Birthday.
7	Wednesday	Normal School Committee. Meeting of Academic Board.
8	Thursday	Finance Committee. Physics Building Committee.
9	Friday	Sports Day.
10	Saturday	The William Molson Hall opened, 1862.
11	SUNDAY	
12	Monday	Museum Committee. Library Committee.
13	Tuesday	
14	Wednesday	Regular Meeting of Corporation. Annual Report to the Visitor.
15	Thursday	
16	Friday	Meeting of Governors. Meeting of Faculty of Arts.
17	Saturday	
18	SUNDAY	
19	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
	Tuesday	
	Wednesday	
	Thursday	
	Friday	
	Saturday	
	SUNDAY	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
30	Friday	Meeting of Faculty of Arts.
31	Saturday	New Library opened, 1893.

NOTE.—Meetings of the Faculty of Arts are held at 5 P.M. unless otherwise specified.

NOVEMBER, 1903.

1	SUNDAY	
2	Monday	Meeting of Faculty of Applied Science.
3	Tuesday	
4	Wednesday	
5	Thursday	
6	Friday	
7	Saturday	Meeting of Faculty of Medicine.
8	SUNDAY	
9	Monday	Edward VII born, 1841.
10	Tuesday	
11	Wednesday	
12	Thursday	Finance Committee.
13	Friday	Meeting of Faculty of Arts.
14	Saturday	
15	SUNDAY	
16	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
17	Tuesday	
18	Wednesday	
19	Thursday	
20	Friday	Meeting of Governors.
21	Saturday	
22	SUNDAY	
23	Monday	
24	Tuesday	
25	Wednesday	
26	Thursday	
27	Friday	Meeting of Faculty of Arts.
28	Saturday	
29	SUNDAY	
30	Monday	

DECEMBER, 1903.

1	Tuesday	
2	Wednesday	Meeting of Academic Board.
3	Thursday	Physics Building Committee.
4	Friday	
5	Saturday	Meeting of Faculty of Medicine.
6	SUNDAY	
7	Monday	Museum Committee. Library Committee. Meeting of Faculty of Applied Science.
8	Tuesday	
9	Wednesday	Regular Meeting of Corporation.
10	Thursday	Finance Committee.
11	Friday	Last day of Lectures in Arts for Term.
12	Saturday	
13	SUNDAY	
14	Monday	Christmas Examinations in Arts begin. Sessional Examinations in Medicine begin.
15	Tuesday	
16	Wednesday	
17	Thursday	
18	Friday	Meeting of Governors. Autumn term of Faculty of Medicine ends. Last day of Lectures in Law.
19	Saturday	
20	SUNDAY	
21	Monday	Christmas Vacation begins. Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
22	Tuesday	
23	Wednesday	
24	Thursday	
25	Friday	Christmas-Day.
26	Saturday	
27	SUNDAY	
28	Monday	
29	Tuesday	
30	Wednesday	
31	Thursday	

1	Friday	
2	Saturday	Meeting of Faculty of Medicine. Meeting of Faculty of Arts. (4 p.m.)
3	SUNDAY	
4	Monday	Lectures in Arts, Law and Applied Science resumed. Winter term Faculty of Medicine begins. Meeting of Faculty of Applied Science.
5	Tuesday	
6	Wednesday	Normal School Committee.
7	Thursday	
8	Friday	Meeting of Faculty of Arts.
9	Saturday	
10	SUNDAY	
11	Monday	
12	Tuesday	
13	Wednesday	
14	Thursday	Finance Committee.
15	Friday	Meeting of Governors.
16	Saturday	
17	SUNDAY	
18	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
19	Tuesday	
20	Wednesday	
21	Thursday	
22	Friday	Queen Victoria died, 1901. Meeting of Faculty of Arts.
23	Saturday	
24	SUNDAY	
25	Monday	
26	Tuesday	
27	Wednesday	
28	Thursday	
29	Friday	
30	Saturday	Theses for M.A. and LL.D. to be sent in.
31	SUNDAY	

FEBRUARY, 1904.

1	Monday	Meeting of Faculty of Applied Science.
2	Tuesday	
3	Wednesday	Meeting of Academic Board.
4	Thursday	Physics Building Committee.
5	Friday	Meeting of Faculty of Arts.
6	Saturday	Meeting of Faculty of Medicine.
7	SUNDAY	
8	Monday	Museum Committee. Library Committee.
9	Tuesday	
10	Wednesday	Regular Meeting of Corporation.
11	Thursday	Finance Committee.
12	Friday	
13	Saturday	
14	SUNDAY	
15	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
16	Tuesday	
17	Wednesday	Ash Wednesday. No lectures.
18	Thursday	
19	Friday	Meeting of Governors. Meeting of Faculty of Arts.
20	Saturday	
21	SUNDAY	
22	Monday	
23	Tuesday	
24	Wednesday	Physics and Engineering Buildings opened 1893.
25	Thursday	
26	Friday	
27	Saturday	
28	SUNDAY	
29	Monday	

MARCH, 1904.

1	Tuesday	
2	Wednesday	Meeting of Academic Board.
3	Thursday	
4	Friday	Meeting of Faculty of Arts.
5	Saturday	Meeting of Faculty of Medicine.
6	SUNDAY	
7	Monday	Meeting of Faculty of Applied Science.
8	Tuesday	
9	Wednesday	
10	Thursday	Finance Committee.
11	Friday	
12	Saturday	
13	SUNDAY	
14	Monday	
15	Tuesday	
16	Wednesday	
17	Thursday	
18	Friday	Meeting of Governors. Meeting of Faculty of Arts. Reports of Attendance on Lectures.
19	Saturday	
20	SUNDAY	
21	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
22	Tuesday	
23	Wednesday	
24	Thursday	
25	Friday	Winter term Faculty of Medicine ends.
26	Saturday	
27	SUNDAY	
28	Monday	
29	Tuesday	
30	Wednesday	
31	Thursday	Last day of Lectures in Arts, Law and Applied Science.

APRIL, 1904.

1	Friday	Good Friday. Easter vacation begins.
2	Saturday	Meeting of Faculty of Medicine.
3	SUNDAY	Easter Sunday.
4	Monday	Meeting of Faculty of Applied Science.
5	Tuesday	Easter vacation ends. Spring term begins, Faculty of Medicine.
6	Wednesday	Normal School Committee.
7	Thursday	Physics Building Committee. Examinations in Arts begin.
8	Friday	
9	Saturday	
10	SUNDAY	
11	Monday	Museum Committee. Library Committee.
12	Tuesday	
13	Wednesday	Regular Meeting of Corporation.
14	Thursday	Finance Committee.
15	Friday	Meeting of Governors.
16	Saturday	
17	SUNDAY	
18	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
19	Tuesday	
20	Wednesday	
21	Thursday	
22	Friday	
23	Saturday	
24	SUNDAY	
25	Monday	
26	Tuesday	
27	Wednesday	
28	Thursday	
29	Friday	Convocation for Degrees in Arts, Law, and Applied Science.
30	Saturday	

1	SUNDAY	
2	Monday	Summer Classes in Arts begin. Meeting of Examiners for School Examinations.
3	Tuesday	
4	Wednesday	
5	Thursday	
6	Friday	
7	Saturday	Meeting of Faculty of Medicine.
8	SUNDAY	
9	Monday	
10	Tuesday	
11	Wednesday	
12	Thursday	Finance Committee.
13	Friday	Lectures end, Faculty of Medicine.
14	Saturday	
15	SUNDAY	
16	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee. Examinations begin, Faculty of Medicine.
17	Tuesday	
18	Wednesday	
19	Thursday	
20	Friday	Meeting of Governors.
21	Saturday	
22	SUNDAY	Whit Sunday.
23	Monday	
24	Tuesday	
25	Wednesday	
26	Thursday	
27	Friday	Normal School closes.
28	Saturday	
29	SUNDAY	Trinity Sunday.
30	Monday	
31	Tuesday	

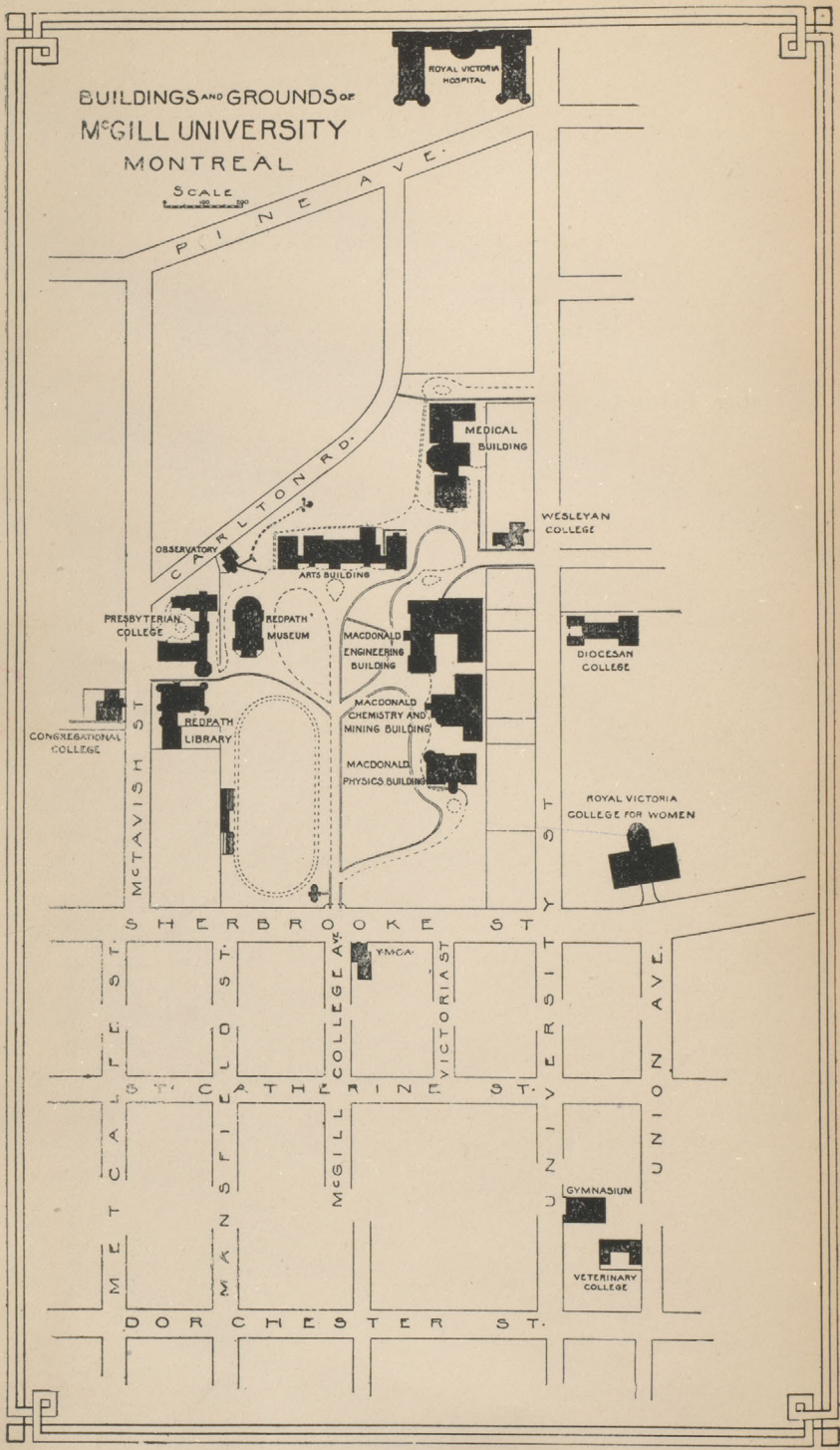
JUNE, 1904.

1	Wednesday	Graduate Course in Medicine begins.
2	Thursday	Physics Building Committee.
3	Friday	
4	Saturday	Meeting of Faculty of Medicine.
5	SUNDAY	
6	Monday	Examinations begin for Matriculation and Associate in Arts. Museum Committee. Library Committee.
7	Tuesday	
8	Wednesday	Regular Meeting of Corporation. Normal School Committee.
9	Thursday	Finance Committee.
10	Friday	Spring Term ends, Faculty of Medicine. Convocation for degrees in Medicine. Summer Classes in Arts end.
11	Saturday	
12	SUNDAY	
13	Monday	
14	Tuesday	
15	Wednesday	
16	Thursday	
17	Friday	Meeting of Governors.
18	Saturday	
19	SUNDAY	
20	Monday	Engineering Building Committee. Chemistry and Mining Building Committee. College Grounds Committee.
21	Tuesday	
22	Wednesday	
23	Thursday	
24	Friday	
25	Saturday	
26	SUNDAY	
27	Monday	
28	Tuesday	
29	Wednesday	Graduate course in Medicine ends.
30	Thursday	

1 Friday	
2 Saturday	Meeting of Faculty of Medicine.
3 SUNDAY	
4 Monday	
5 Tuesday	
6 Wednesday	
7 Thursday	
8 Friday	
9 Saturday	
10 SUNDAY	
11 Monday	
12 Tuesday	
13 Wednesday	
14 Thursday	
15 Friday	
16 Saturday	
17 SUNDAY	
18 Monday	
19 Tuesday	
20 Wednesday	
21 Thursday	
22 Friday	
23 Saturday	
24 SUNDAY	
25 Monday	
26 Tuesday	
27 Wednesday	
28 Thursday	
29 Friday	
30 Saturday	
31 SUNDAY	

AUGUST, 1904.

1 Monday	
2 Tuesday	
3 Wednesday	
4 Thursday	
5 Friday	
6 Saturday	
7 SUNDAY	
8 Monday	
9 Tuesday	
10 Wednesday	
11 Thursday	
12 Friday	
13 Saturday	
14 SUNDAY	
15 Monday	
16 Tuesday	Peter Redpath Museum opened 1882.
17 Wednesday	
18 Thursday	
19 Friday	
20 Saturday	
21 SUNDAY	
22 Monday	
23 Tuesday	
24 Wednesday	
25 Thursday	
26 Friday	
27 Saturday	
28 SUNDAY	
29 Monday	
30 Tuesday	
31 Wednesday	



Buildings and Grounds.—McGill University.

McGill University.

GENERAL INFORMATION.

Foundation and Early History.

Almost alone in this respect among Canadian colleges and universities, McGill University owes its origin to a private endowment. Its founder, the Hon. James McGill, from whom the University takes its name, was born on the 6th October, 1744, in Glasgow, Scotland, where he received his early education and training. Emigrating to Canada before the American Revolution, he engaged in the North-West fur trade, then one of the leading branches of business in Canada. Subsequently he settled in Montreal, and, in partnership with his brother, Andrew McGill, became one of its leading merchants, distinguished for his public spirit and his exertions for the advancement of the city. He was lieutenant-colonel and subsequently colonel of the Montreal City Militia; and, in his old age, on the breaking out of the American war of 1812, he became brigadier-general, and was prepared to take the field in defence of his country. He also represented the West Ward of Montreal in the Provincial Legislature, and was afterwards a member of the Legislative and Executive Councils. Cultivating and enjoying the society of the few men of learning then in the colony, he took a special interest in the establishment of an educational system in the Province of Quebec. By his will, bearing date the 8th January, 1811, more than two years before his death, which happened on the 19th December, 1813, he bequeathed his property of Burnside and a sum of £10,000 in money, to found a college in a provincial university, the erection of which had already been provided for by the generosity of the British Government. Three leading citizens of Montreal were among the trustees appointed under his will, who were directed to convey the subject property of the bequest to the Royal Institution for the Advancement of Learning, a body which, in 1802, had been incorporated by the Legislature "for the establishment of Free Schools and the advancement of Learning" in the Province of Quebec. The conditions upon which the property was to be transferred to the Royal Institution for the Advancement of Learning were, mainly, that that Institution should, within ten years after the testator's decease, erect and establish on his Burnside estate "an University or College, for the purposes of education and the advancement of learning in this Province," and that the college, or one of the colleges, in the University, if established, should "be named and perpetually be known and distinguished by the appellation of McGill College." Owing to persistent opposition by the leaders of one section of the people to any system of governmental education and to the refusal by the Legislature to make the grants of land and money which had been promised, the proposed establishment of the provincial university by the British Government was abandoned.

In so far as the McGill College was concerned, however, the Royal Institution at once took action by applying for a Royal Charter. Such a charter was granted in 1821, and the Royal Institution prepared to take possession of the estate. But, owing to protracted litigation, this was not surrendered to them till 1829. Commencing then the work of teaching with two faculties, Arts and Medicine, the record of the first thirty years of the University's existence is an unbroken tale of financial embarrassment and administrative difficulties. The charter was cumbrous and unwieldy, and unsuited to a small college in the circumstances of this country, and the University, with the exception of its medical faculty, became almost extinct. But after thirty years the citizens of Montreal awoke to the value of the institution which was struggling in their midst. Several gentlemen undertook the responsibility of its renovation, and, in 1852, an amended charter was secured. The Governor-General of Canada for the time being, Sir Edmund Head, became interested in its fortunes, and in 1855, with the advent of a new Principal, an era of progress and prosperity began.

Constitution of the University.

By the amended Charter "the Governors, Principal, and Fellows" of the University are constituted a body politic and corporate, with all the usual rights and privileges of corporate bodies. The supreme authority of the University, however, is vested in the Crown, and is exercised by His Excellency the Governor-General of Canada for the time being as **Visitor.** This is a special and important feature of the constitution, for, while it gives the University an imperial character and removes it at once from any merely local or party influence, it secures the patronage of the head of the political system of the country.

The Governors of the University are the members of the Royal Institution for the Advancement of Learning, above mentioned, and in them are vested the management of finances the passing of University statutes and ordinances, the appointment of professors, and other important duties. Their number is limited to fifteen, and vacancies are filled by the nomination of the remaining members, with the approval of the Visitor. The President of the Board of Governors is, *ex-officio,* Chancellor of the University.

The **Principal** is the academic head and chief administrative officer. He is appointed by the Board of Governors, and is, *ex-officio,* Vice-Chancellor of the University.

The **Fellows** are limited to 43 in number, and are selected with reference to the representation of all the faculties and

departments of the University, of affiliated colleges, and of other bodies.

The Governors, Principal, and Fellows, together constitute the **Corporation,** the highest academical body. Its powers are fixed by statute, and include the framing of all regulations touching courses of study, matriculation and graduation, and the granting of degrees.

The Principal, the Deans of the several Faculties, the Professors and Associate Professors, and other members, not exceeding ten in number, of the teaching staff, constitute the **Academic Board** of the University, with the duty of considing such matters as pertain to the interests of the University as a whole, and of making recommendations concerning the same.

The Statutes and Regulations of the University have been framed on the most liberal principles, with the view to affording to all classes of persons the greatest possible facilities for the attainment of mental culture and professional training.

Faculties and Courses.

The educational work of the University is carried on in McGill College, the Royal Victoria College for Women, and other University buildings in Montreal, and in affiliated colleges.

The Faculties are four in number :

The Faculty of Arts.—The undergraduate courses of study extend over four Sessions of seven and a half months each. In the third and fourth years extensive options are provided, and certain exemptions also are allowed to professional students. The courses of study lead to the Degrees of B.A., M.A., B.Sc., M.Sc., D.Sc., and D.Litt. The Degree of B.A. from this University admits the holder to the study of the learned professions, without preliminary examination, in the Provinces of Canada, and in Great Britain and Ireland, and elsewhere.

The undergraduate course in Arts can be taken along with the undergraduate course in Medicine or Applied Science in six years, or with the undergraduate course in Law in five years. This is effected by avoiding the duplication of courses in the same subjects or in those which give the same educational training, and by a proper adaptation of the time tables. Alternatively, a certificate of Literate in Arts is given along

with the Degree in Medicine, Applied Science, or Law, to candidates who have completed two years in Arts before entering the professional Faculty.

The curriculum in Arts provides for the education of women, mainly in separate classes, with courses of study, exemptions, degrees, and honours identical with those for men.

The Faculty of Applied Science.—The undergraduate courses of study extend over four Sessions of seven and a half months each, and provide a thorough professional training in Civil Engineering, Mechanical Engineering, Metallurgy, Mining Engineering, Electrical Engineering, Practical Chemistry, and Architecture. The courses of study lead to the Degrees of B.Sc., M.Sc., and D.Sc. The undergraduate course in Arts can be taken along with the undergraduate course in Applied Science in six years.

The Faculty of Law.—The undergraduate course extends over three Sessions of eight months each, and leads to the Degrees of B.C.L. and D.C.L. The undergraduate course in Arts can be taken along with the undergraduate course in Law in five years.

The Faculty of Medicine.—The undergraduate course of study extends over four Sessions of nine months each, and leads to the Degree of M.D., C.M. The undergraduate course in Arts can be taken along with the undergraduate course in Medicine in six years.

Examinations in Music.

An arrangement has been made whereby the University has undertaken, in conjunction with the Associated Board of the Royal Academy of Music and the Royal College of Music, London, England, to carry on throughout Canada the Examinations in Music hitherto conducted by the Associated Board alone. Under this arrangement, the University will be responsible for the proper and effective conduct of the Examinations, and successful candidates will be entitled to receive certificates bearing the imprimatur of the University as well as that of the Associated Board.

These examinations comprise School Examinations (Elementary, Lower and Higher divisions) and Local Centre Examinations (Junior and Senior grades)—the Senior grade calling for a high degree of proficiency. They are of gradu-

ated difficulty ; are theoretical and practical in character, embracing Rudiments of Music, Harmony and Grammar of Music, Counterpoint, Pianoforte, Organ, Violin, Harp, Wind Instruments, Singing, etc.; and are suited to candidates of all degrees of proficiency.

In addition to those above-named there is an examination for individual Teaching Certificates and title of Licentiate of the Associated Board.

The examinations in Practical subjects will be held during May and those in Theory in the early part of the same month.

Full details of the requirements for each examination, fees, etc., are published in a separate syllabus, which can be obtained, together with specimen Theory papers and full information, on application to the Registrar of the University.

Affiliated Colleges.

Students of Affiliated Colleges are matriculated in the University, and may pursue their course of study in the Affiliated College, or in part in the Affiliated College, and in part in McGill College, as the case may be, and may come up to the University Examinations on the same terms as the students of McGill College.

The Stanstead Wesleyan College, Stanstead, P.Q.—Is affiliated in so far as regards the work of the first two years in Arts. Detailed information may be obtained from the Rev. C. R. Flanders, B.A., D.D., Principal.

Vancouver College, Vancouver, B.C.—Is affiliated in so far as regards the work of the first two years in Arts. Detailed information may be obtained from J. C. Shaw, Esq., M.A., Principal.

Victoria College, Victoria, B.C.—Is affiliated in so far as regards the work of the First Year in Arts. Detailed information may be obtained from the Principal.

Affiliated Theological Colleges.

Students of the following Affiliated Theological Colleges may attend the courses of study in Arts, either as undergraduates or partial students, with such facilities in regard to exemptions as may be agreed on.

The Congregational College of Canada, Montreal. Principal, Rev. E. M. Hill, D.D., 58 McTavish St.

The Presbyterian College, Montreal, in connection with the Presbyterian Church in Canada. Acting Principal, Rev. John Campbell, M.A., LL.D.

The Wesleyan College of Montreal. Principal, Rev. W. I. Shaw, D.D., LL.D.

The Diocesan College of Montreal.—Principal, Rev. Henry M. Hackett, M.A., B.D., 201 University St.

Calendars of the above Colleges and all necessary information may be obtained on application to their Principals.

McGill Normal School.

The McGill Normal School provides the training requisite for Teachers of Elementary and Model Schools and Academies. Teachers trained in this School are entitled to Provincial Diplomas, and may, on certain conditions, enter the classes in the Faculty of Arts for Academy Diplomas and for the Degree of B.A. Principal, S. P. Robins, LL.D., 32 Belmont St., Montreal, from whom copies of the School announcement may be obtained.

Affiliated High Schools, Etc.

The following schools are affiliated in the sense of preparing candidates for matriculation:

The Trafalgar Institute for the higher education of women, Simpson St., Montreal—Principal, Miss Grace Fairley. The High School of Montreal, and the Girls' High School of Montreal, Metcalfe St.—Principal, Rev. Elson I. Rexford, B.A.

Schools which have prepared successful candidates for the University School Examinations or for matriculation (June 1902).

High School, Montreal; Girls' High School, Montreal; Abingdon School, Montreal; Miss Symmers' and Miss Smith's School, Montreal; Westmount Acad.; St. Andrew's School, Annapolis Royal, N.S.; All Hallows' School, Yale, B.C.; Aylmer Academy; Bedford Academy; Belleville H. S.; Bishop's College School, Lennoxville; The Catholic High School, Montreal; Brockville C. I.; Coaticook Academy; Cookshire Acad.; Cowansville Academy; Crichton School; Danville Acad.; Dufferin Grammar School, Brigham, Que.; Dunham Ladies' Coll.; Gault Institute, Valleyfield; Granby Academy; Highfield School; Huntingdon Acad.; Inverness Acad.; Knowlton Acad.; Lachute Acad.; Lennoxville Academy; Magog Mod. School; Morrin College, Que.; Morrisburg C. I.; Nanaimo High School; Ormstown Acad.; Ottawa Col. Inst.; Ottawa Ladies' College; Prince of Wales College, Charlottetown, P.E.I.; Boys' H.S., Quebec; Girls' H.S., Quebec; Ridley Coll., St. Catharines; Sabrevois College, Montreal; The Senior School, Montreal; Shawville Academy; School of St. John the Evangelist; Sherbrooke Acad.; Stanstead College School; Sutton Acad.; St. Alban's School, Brockville; St. Lambert Mod. School; St. Francis Coll. School; St. John's H.S.; Three Rivers High School; Upper Canada Col.; Vancouver Coll., Vancouver, B.C.; High School, Victoria, B.C.; Waterloo Acad.; Williamstown H.S.

Affiliation to other Universities.

The University is affiliated to the Universities of Oxford, Cambridge, and Dublin, under conditions which allow an undergraduate who has taken two years' work, and has passed the University Intermediate Examination in Arts, to pursue his studies and take his Degree at any of those universities on a reduced period of residence.

The Session.

The University Year or Session is divided into two terms, the first extending to the Christmas vacation, and the second from the expiry of the Christmas vacation to the date appointed for the meeting of Convocation for the conferring of degrees.

For 1903-1904 the Session of the **Faculty of Arts** commences on 22nd September, 1903, and ends on 29th April, 1904. Second Year Exhibition, Scholarship and Supplemental Examinations begin on September 9th. Summer classes in English, Latin, Greek, Mathematics, Physics, Chemistry, French, German and Logic will be held during the months of May and June.

The Session of the **Faculty of Applied Science** commences on 22nd September, 1903, and ends on 29th April, 1904. Field work in Surveying commences on 24th August, 1903. The Summer School in Mining commences at the end of the Session, and continues to about the end of the second week in June.

The Session of the **Faculty of Law** commences on 15th September, 1903, and ends on 29th April, 1904.

The Session of the **Faculty of Medicine** commences on 23rd September, 1903, and ends on 10th June, 1904. The Introductory Lecture will be given on 22nd September.

Examinations for entrance to the above-named Faculties will be held in June and September—commencing in September on the 9th. See time table pp. 19 and 20.

Board and Residence.

No residential accommodation has as yet been provided in the College for men students. Women students may board and reside either in private houses or in the Royal Victoria College, which provides, in addition to separate lecture rooms, residential accommodation for the women students of the University.

Good board and lodgings can be obtained in private houses in the vicinity of the University buildings at a cost of from $16 to $25 per month; or, separately, board at $12 to $15 per month, rooms at $4 to $10 per month.

A list of suitable boarding and lodging houses, the sanitary conditions of which are required to be properly certified, is prepared annually, and may be obtained upon application to the Registrar of the University or the Janitor of the Medical Building.

Full particulars of the Royal Victoria College for Women and the terms of residence therein are given on pp. 136-140.

The erection of suitable University residential halls for men is contemplated in the near future.

The McGill Y.M.C.A. will arrange to meet any stranger at the station, and aid him to secure lodgings, etc., if sufficient notice of time of arrival and station is sent to the secretary of the McGill Y.M.C.A., 844 Sherbroke Street, Montreal.

Exhibitions, Scholarships, Prizes, Etc.

Bursaries, Exhibitions, and Scholarships, particulars of which are given in the announcements of the several Faculties (see *post*), are offered for competition to students every year. In addition to a number of valuable exhibitions and scholarships open to Second and Third Year students, nineteen Exhibitions, ranging in value from $100 to $300 each, will be offered for competition to students entering the First Year in Arts, in June, 1903. For details of the examination see pp. 47-53.

Gold Medals, Honours, and Prizes are awarded for advanced courses of study.

Classification of Students.

Except under special circumstances, no student under the age of sixteen is admitted to the First Year courses, or under the age of seventeen to the Second Year courses in Arts, Applied Science, or Medicine, and no student under the age of seventeen is admitted to the course in Law.

Students are classified as Graduate Students (see pp. 26 and 142), Undergraduates, Conditioned Students and Partial Students.

Undergraduates are matriculated students who are pursuing a full undergraduate course of study leading to a degree.

Conditioned Students are those who, not having completed their matriculation examination, are pursuing a full undergraduate course of study leading to a degree, and are entitled, under the regulations of the Faculty, to obtain undergraduate standing upon completing their matriculation; credit being given for their work as Conditioned Students (see below).

Partial Students are those who, not belonging to one of the above classes of students, are pursuing a course of study in the University.

Women are admitted to the courses in Arts (on identical terms with men, but mainly in separate classes), and also to the Architectural, Freehand Drawing, and Modelling Classes in Applied Science.

All students are required to attend lectures at the University buildings in Montreal, or at one of the affiliated colleges.

Undergraduates.

In order to obtain undergraduate standing, a candidate must have passed the Matriculation Examination of the University, or some other examination accepted in lieu thereof (see p. 11), and have registered as a Matriculated Undergraduate.

Conditioned Students.

Candidates who in the September Matriculation Examination fail in a small part only of the whole examination may, if their general standing is sufficiently high, be allowed to enter the First Year Undergraduate Course as Conditioned Students. Such students can obtain full undergraduate standing, by passing at a subsequent June or September Matriculation Examination in the subjects in which they failed, and will not be permitted to enter the second year of their course of study until such examinations have been passed.

Partial Students.

Partial Students may, subject to the approval of the Professor, attend any class without previous examination.

Partial Students who subsequently obtain undergraduate standing by passing the Matriculation Examination may, as Undergraduates, be exempted, at the discretion of the Faculty, from a particular course or courses of lectures which they attended as Partial Students.

MATRICULATION.

I. Matriculation Examination Regulations.

1. Matriculation Examinations (for entrance into all Faculties) are held only in June and September—in June at McGill College and (on application) at Local Centres; in September at McGill College and affiliated colleges (Vancouver, B.C., and Stanstead, P.Q.) only.

All inquiries relating to the Examination should be addressed to the Registrar of the University.

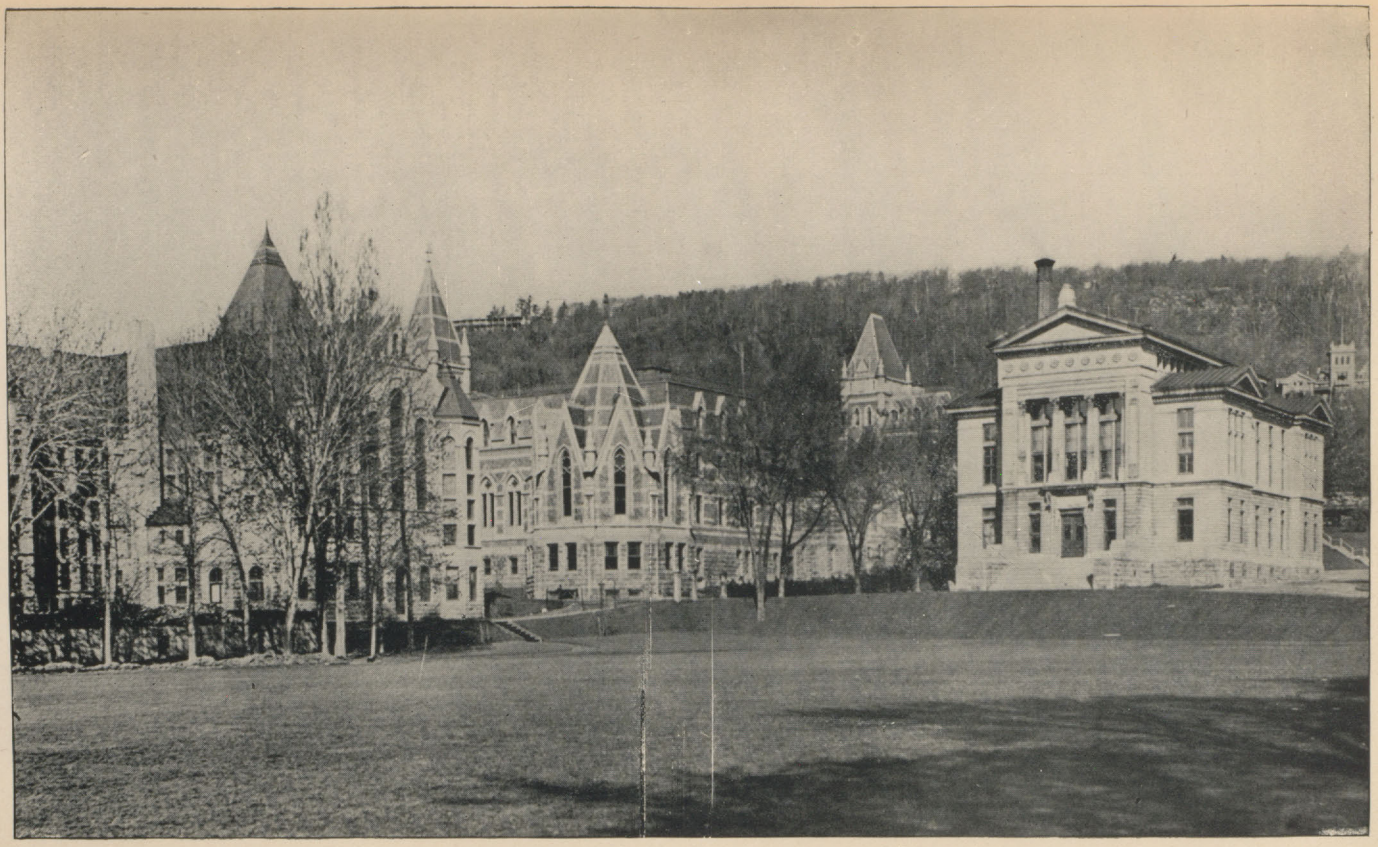
2. Every candidate for examination is required to fill up an application form and return the same with the necessary fee one month before the examination. Blank forms may be obtained from the Registrar.

3. Applications for examinations at Local Centres must be made before May 1st. The University will be responsible for no other local expenses than the payment of the Deputy-Examiners.

4. The Matriculation Examination is divided into two parts, Preliminary and Final. The subjects of the Preliminary Division may be taken at any Matriculation Examination, and those of the Final Division at the same or any subsequent examination, but (except as provided in the two following regulations) a candidate must pass in the whole of either division at one time in order to secure exemption from further examination therein.

5. Candidates who fail in one or more subjects at the June examination, or who have taken part only of the examination, and present themselves in the *following* September, will not be required to take the subjects in which they passed in June.

6. Candidates who in the September Examinations fail in a small part only of the whole examination may, if their general standing is sufficiently high, be allowed to enter the First Year Undergraduate Course as Conditioned Students. Such students can obtain full undergraduate standing by passing at a subsequent June or September Matriculation Examination in the subjects in which they failed, and will not be permitted to enter the Second Year of their Course of Study until such examinations have been passed.



The Museum from the Campus.

7. Certificates of having passed the following examinations will, if submitted to the Registrar, be accepted *pro tanto* in lieu of the Matriculation Examination, *i. e.*, in so far as the subjects and standard are, to the satisfaction of the Board of Matriculation Examiners, the same as or equivalent to those required for the Matriculation Examination of the University; but candidates offering certificates of having passed such examinations will be required to pass the Matriculation Examination in such of the required subjects, if any, as are not covered thereby:—

Province of Quebec.

The Preliminary subjects of the A. A. Examination and Academy Grade I.

The University School (A.A.) Examinations.

The Examination for the Model School Diploma of the McGill Normal School, under certain conditions.

Province of Ontario.

The Leaving Examinations, Parts I. and II.

Province of New Brunswick.

The Examinations for Superior and Grammar School Licenses.

Province of Nova Scotia.

The Leaving Examinations, Grades XI. and XII.

Province of Prince Edward Island.

The Leaving Examination of Prince of Wales College.

Province of British Columbia.

The Intermediate and Senior Grade Examinations.

Applications for exemptions from the Matriculation Examination, based upon certificates of having passed examinations other than those above mentioned, will be considered as occasion may require by the Board of Matriculation Examiners. Every such application must be accompanied by certificates and full particulars, and should be addressed to the Registrar.

II. Matriculation Fees.

See p. 28.

III. Subjects of Examination

FACULTY OF ARTS.

PRELIMINARY DIVISION

(See Regulation 4, page 10.)

English :
(Composition, Dictation, Grammar).
British History.
Arithmetic.

FINAL DIVISION.

For Candidates intending to take the B.A. Course:—

1. **English Literature.**
2. **Latin** *or* **Greek.**
3. One of the following :
   Greek *or* **Latin** (the one not already chosen), **French, German.**
4. **Algebra, Part I.**
5. **Geometry, Part I.**
6. One of the following :
   Physiography, Botany, Chemistry, Physics, a **Language** not already chosen.

For Candidates intending to take the B.Sc. Course in Arts:—

(See p. 64 for character of course).

1. **English Literature.**
2. **French.**
3. **German.**
4. **Algebra, Part I.**
5. **Geometry, Part I.**
6. One of the following :
   Physiography, Botany, Chemistry, Physics. Latin, Greek.

Candidates who intend ultimately to proceed to the study of Medicine are reminded that for Medical Registration it will be necessary to take Latin.

Eleven Exhibitions, of the average value of $100, will be offered for award on the result of the Matriculation Examination in the subjects of the Final Division, in June next; five, each of the value of $150, on the result of an Examination on the subjects required for Matriculation, together with additional work; and three, of the value of $300 each, for an examination on special work.

Full particulars are given in the First Year Exhibition Announcement.

FACULTY OF APPLIED SCIENCE.

PRELIMINARY DIVISION

(*See Regulation 4, page 10.*)

English:
(Composition, Dictation, Grammar).
British History.
Arithmetic.

FINAL DIVISION.

1. **English Literature.**
2. One of the following:
   French, German, Latin, Greek.
3. **Algebra, Parts I and II.**
4. **Geometry, Parts I and II.**
5. **Trigonometry.**
6. One of the following:
   Physiography, Botany, Chemistry, Physics, a **Language** not already chosen.

In addition to those who qualify in whole or in part on certificates mentioned on p. 11, par. 7, students who have completed one or more years of the Arts Course in any recognized University, may enter the Faculty on passing an examination in the additional mathematics, if any, required for Matriculation in Applied Science.

French candidates for Matriculation in this Faculty will be allowed to take examinations in French equivalent to those required in English and an examination in English equivalent to that required in French.

FACULTY OF MEDICINE.

PRELIMINARY DIVISION

(*See Regulation 4, page 10.*)

English:
(Composition, Dictation, Grammar).
British History.
Arithmetic.

FINAL DIVISION.

1. **English Literature.**
2. **Latin.**
3. **Algebra, Part I.**
4. **Geometry, Part I.**
5. **Chemistry.**
6. **Physics.**
7. One of the following:
   Greek, French, German.

In addition to the certificates mentioned on p. 11, par. 7, the following are accepted in lieu of the Matriculation Examination for entrance in Medicine, provided they cover Latin:—

The Degree of Bachelor of Arts obtained from any recognized university.

A certificate of having passed the Examination of a Provincial Medical Council.

In the case of candidates from the United States, a certificate of having passed a State or University Examination fully equivalent to the Matriculation Examination required for entrance in this University.

The examination requirements for those who intend to practise medicine in any of the Provinces of Canada, or in Great Britain and Ireland and the British Colonies, will be found in the University or Medical Calendar.

FACULTY OF LAW.

PRELIMINARY DIVISION

(*See Regulation 4, page 10.*)

English:
(Composition, Dictation, Grammar).
British History.
Arithmetic.

FINAL DIVISION.

1. **English Literature.**
2. **Latin.**
3. **French.**
4. **Algebra, Part I.**
5. **Geometry, Part I.**
6. One of the following :

Physiography, Botany, Chemistry, Physics, Greek, German.

Candidates must reach a high standard in Latin and French.

In addition to those who qualify in whole or in part on certificates mentioned on p. 11, par. 7, Bachelors of Arts, Science, or Letters of any Canadian or British University (see R.S.Q., 3503*a*) are admitted without examination.

Candidates who intend to practise law or to be admitted to the notarial profession in the Province of Quebec are referred to the statutory requirements (see p. 229). If they are not graduates they should pass the examination for admission to study required by the Council of the Bar or by the Board of Notaries, as the the case may be, before seeking to matriculate. In that case they will be matriculated without examination.

IV. Details of the Requirements in each Subject.

PRELIMINARY DIVISION

English:

(Composition, Dictation, Grammar).

Candidates will write a short essay on a subject given at the time of the examination.

A paper on English Grammar, including Analysis The candidate will be expected to show a good knowledge of Accidence, as treated in any grammar prepared for the higher forms of schools. A similar statement applies to grammatical Analysis. Candidates are required to state the class to which any subordinate sentence belongs, and to arrange and define the various members of all sentences set. Failure in Analysis or Parsing will cause the rejection of the paper. West's English Grammar for Beginners is recommended as a text-book.

British History.

Candidates will be required to show a somewhat intimate acquaintance with the History from 1485 to the present time. While any text-book written for the upper forms of schools may be used in preparation for the examination, Gardiner's Outline of English History (Longmans) is recommended.

Arithmetic.

All the ordinary rules, including Square Root and a knowledge of the Metric System.

FINAL DIVISION.

English Literature.

1903. (*a*) SCOTT's Lady of the Lake (ed. Stuart, Macmillan), or Selections from Tennyson, Part. I. (ed. Rowe and Webb, Macmillan) ; (*b*) SHAKSPERE's Richard II. (ed. Deighton, Macmillan.)

1904. Selections from Tennyson, Part. I., (ed. Rowe & Webb, Macmillan) ; SHAKSPERE's Merchant of Venice.

The requirements for the Junior Leaving English of the Province of Ontario will be accepted.

Greek.

Grammar.

Texts.—(Translation and grammatical study):—

1903—Xenophon, Anabasis I (as in White's Beginners' Greek Book, pp. 304-428), or Xenophon, Anabasis II.

1904 and 1905—As in 1903.

Translation at Sight, and Prose Composition (sentences and easy narrative based upon the prescribed texts).

The requirements for the Junior Leaving Greek of the Province of Ontario will be accepted in place of the texts specified above. At the September Examination other texts equivalent to those specified may be accepted if application be made to the Registrar, at least one month before the date of the examination.

Latin.

Grammar.

Texts.—(Translation and grammatical study):—

1903—Cornelius Nepos, Lives of Miltiades and Epaminondas (G. H. Nall in Macmillan's Elementary Classics).

Caesar, De Bello Gallico, I. and II. Ovid, Stories from the Metamorphoses (as in Gleason's "A Term of Ovid," pages 1 to 53, American Book Company).

1904—As in 1903.

1905—Cornelius Nepos, Lives of Themistocles and Aristides (G. H. Nall in Macmillan's Elementary Classics); Cæsar, De Bello Gallico, Bks. IV. and V; Ovid, Stories from the Metamorphoses (as in Gleason's "A Term of Ovid," pages 54 to the end, American Book Company).

Translation at Sight, and Prose Composition (sentences and easy narrative based upon the prescribed texts).

The requirements for the Junior Leaving Latin of the Province of Ontario will be accepted in place of the texts specified above. At the September Examination other texts in Latin equivalent to those specified may be accepted, if application be made to the Registrar at least a month before the day of the examination.

French.

Grammar.—Accidence and Syntax. Candidates will be required to possess an exact knowledge of the common elements. Bertenshaw's French Grammar is recommended as containing the amount required for the examination.

Translation at Sight from French into English. Translation into French of easy English passages.

German.

Grammar.—A thorough knowledge of German accidence.

Translation.—Candidates must be able to translate into German with tolerable correctness exercises approximately equal in difficulty to those contained in the First Part of Van der Smissen's High School German Grammar, or in the First and Second Parts of the Joynes-Meissner German Grammar (Heath & Co.)

Texts.—(Translation and grammatical study):—

1903—Leander, Träumereien (Copp, Clark Co.).

1904 and 1905—Auf der Sonnenseite (Heath & Co.).

Storm, Immensee.

The requirements for the Junior Leaving German of the Province of Ontario will be accepted in place of the texts specified above. At the September examination other texts equivalent to those specified may be accepted, if application be made to the Registrar, at least one month before the date of the examination.

Algebra, Part I.

Elementary Rules, Involution, Evolution, Fractions, Indices, Surds, Simple and Quadratic Equations of one or more unknown quantities, as in Hall and Knight's Elementary Algebra to end of Surds (omitting portions marked with an asterisk), or in similar text-books.

Algebra, Part II.

The three Progressions, Ratio, Proportion, Variation, Permutations and Combinations, Binomial Theorem, Logarithms, Interest and Annuities, as in remainder of Hall and Knight's Elementary Algebra, (omitting chaps. 36, 40, 41, 42) or in similar text-books.

Geometry, Part I.

Euclid's Elements, Books I, II, III, with easy deductions; or an equivalent.

Geometry, Part II.

Euclid's Elements, Books IV and VI, with definitions of Book V, and easy deductions; or an equivalent.

Trigonometry.

Measurement of angles, Trigonometrical ratios or functions of one angle, of two angles and of a multiple angle, as in Hamblin Smith's Trigonometry, pp. 1-105, or as in Lock's Elementary Trigonometry, Chap. I-XII, or in similar text-books.

Physiography.

The elements of the Science, as in Davis's Elementary Physical Geography, Tarr's First Book of Physical Geography, or other text-books covering the same ground.

Botany.

As in Groom's Elementary Botany.

Candidates will be given extra credit for Plant collections

of a maximum of 25 species each. They will use Penhallow's Guide to the Collection of Plants and Blanks for Plant Descriptions.

The collections will be returned, if desired, at the expense of the school or individuals to whom they belong.

Any plant of the same family may be substituted for any one of those specified in Part II of Groom's Elementary Botany, according to the requirements of the locality.

Chemistry.

Elementary Inorganic Chemistry, comprising the preparation and properties of the chief non-metallic elements and their more important compounds, the laws of chemical action, combining weight, etc. (The ground is simply and effectively covered by Remsen's "Elements of Chemistry," pp. 1 to 165, Macmillan's Edition).

Physics.

Properties of Matter; Elementary Mechanics of Solids and Fluids, including the Laws of Motion, Simple Machines, Work, Energy, Fluid Pressure and Specific Gravity; Thermometry, The effects and modes of transmission of Heat. (See for instance, Gage's Introduction to Physical Science, ch. I-V.)

V. Dates of the Examinations.

The examinations in 1903 will commence on June 8th and on September 9th. Special arrangements may be made for the examination of candidates who are prevented by severe illness or domestic affliction from presenting themselves on the dates fixed.

The time table for the September examination will be as follows :—

WEDNESDAY, 9TH.

Morning,	9–10.30.—English Grammar.
	10.30–11.—English Dictation.
	11–12.—English Composition.
Afternoon,	2–3.30.—English Literature.
	3.30–5.—Physiography.

THURSDAY, 10TH.

Morning, 9–11.—Algebra, Part I.

Afternoon, 2–4.—Geometry, Part I.
4–5.30.—Physics.

FRIDAY, 11TH.

Morning, 9–10.30.—Arithmetic.
10.30–12.—British History.

Afternoon, 2–4.—Algebra, Part II and Geometry, Part II.
4–5.30.—Botany.

MONDAY, 14TH.

Morning, 9–11.—Latin Grammar and Composition.
11–12.30.—Trigonometry.

Afternoon, 2.30–4.30.—Latin Books and Sight Translation.

TUESDAY, 15TH.

Morning, 9–11.—French.

Afternoon, 2–4.—German.
4–5.30.—Chemistry.

WEDNESDAY, 16TH,

Morning, 9–11.—Greek Grammar and Composition.

Afternoon, 2–4.—Greek Books and Sight Translation.

Admission to Second Year.

Admission to the Second Year is open, as a rule, only to Undergraduates who have passed the First Year Sessional Examination in regular course, but in exceptional cases, to be dealt with by the Faculty in which they desire to register, candidates may be admitted directly to the Second Year without having passed through the curriculum of the First Year.

Students of other Universities Applying for Equivalent Standing.

Any student of another University desirous to be admitted to this University with equivalent standing is requested to send with his application:—

1st.—A Calendar of the University in which he has studied, giving a full statement of the courses of study.

2nd.—A complete statement of the course he has followed.

3rd.—A certificate of the standing gained, and of conduct.

These will be submitted to the Faculty in which he desires to register.

The Faculty, if otherwise satisfied, will decide what examination, if any, or what conditions, may be necessary before admitting the candidate.

DEGREES.

All theses for higher degrees must be sent to the Registrar of the University. No thesis will be received or examination granted until the fee for the degree has been paid.

In order to obtain the degrees of B.A., B.Sc., B.C.L. and M.D., C.M., students of this University are required to attend the lectures and to pass the examinations of the undergraduate courses.

Regulations for the Degree of B.A.

Students who shall have satisfactorily completed the Regular Course of Study in Arts, shall have passed the prescribed examinations during the Course, and also the special examinations for graduation, and shall have performed such exercises as may be prescribed to that end, shall be entitled to the Degree of Bachelor of Arts.

Regulations for the Degree of B.Sc.

Students who shall have satisfactorily completed the prescribed Course of Study in the Faculty of Arts for the Degree of Bachelor of Science, or the Course of Study in the Faculty of Applied Science, shall have passed the prescribed examina-

tions during the Course, and also the special examinations for Graduation, and shall have performed such exercises as may be prescribed to that end, shall be entitled to the Degree of Bachelor of Science.

Regulations for the Degree of B.C.L.

Students who shall have satisfactorily completed the Regular Course of Study in Law, shall have passed the prescribed examinations during the Course and also the special examinations for Graduation, shall be entitled to the Degree of Bachelor of Civil Law. A Bachelor or Master of Arts, or an Articled Student with a practising Member of the Bar of the Province of Quebec, who shall have matriculated in the third year of his Clerkship under such articles, shall be entitled to such Degree after two years' attendance on the said Course of Study, if he shall satisfactorily pass all requisite examinations, and perform all required exercises.

Regulations for the Degree of M.A.

Bachelors of Arts of this University, of at least one year's standing, who (*a*) shall have taken for one year a graduate course of study in Arts in the University, previously submitted to and approved by the Faculty, and (*b*) shall have passed an examination at the end of the course, and (*c*) shall have presented, if required, a satisfactory thesis, shall be entitled to the Degree of Master of Arts. Bachelors of Arts of at least two years' standing who shall have presented a satisfactory thesis and passed a special examination, shall be entitled to the Degree of Master of Arts.

Any Bachelor of Arts who graduated prior to May 1st, 1899, or any Undergraduate in Arts registered at that date, and proceeding thereafter to the Degree of Bachelor of Arts, shall at his option be entitled to the Degree of Master of Arts on the following conditions:

1. A candidate must be a Bachelor of Arts of at least three years' standing.

2. He is required to prepare and submit to the Faculty a thesis on some literary or scientific subject, under the following rules:—

(*a*) The subject of the thesis must be submitted to the Faculty before the thesis is presented.

(*b*) A paper read previously to any association, or published in any way, cannot be accepted as a thesis.

(*c*) The thesis submitted becomes the property of the University, and cannot be published without the consent of the Faculty of Arts.

(*d*) The thesis must be submitted before some date to be fixed annually by the Faculty, which date must not be less than two months before the candidate proceeds to the Degree.

The last day in the session of 1903-1904 *for sending in Theses for M.A will be Jan. 30th,* 1904.

3. All candidates, except those who have taken First or Second Rank B.A. Honours, or have passed First Class in the Ordinary Examinations for the Degree of B.A., are required to pass an examination also, either in Literature or in Science, as each candidate may select.

The subjects of the Examination in *Literature* are divided into three divisions, as follows:—

Group A.—Latin, Greek, Hebrew.

Group B.—French, German, English.

Group C.—History, Economics and Political Science, Law.

The subjects of the Examination in *Science* are divided into three divisions:—

Group A.—Pure Mathematics (advanced or ordinary), Mechanics (including Hydrostatics), Astronomy, Optics.

Group B.—Geology and Mineralogy, Botany, Zoology, Chemistry.

Group C.—Mental Philosophy, Moral Philosophy, Logic, History of Philosophy.

Every candidate is required to select two out of the three groups in the section in which he is a candidate; and in one of the groups so chosen to select for Examination two subjects, and in the other group one subject.

One of the subjects selected as above will be considered the principal subject (being so denoted by the candidate at the time of application), and the other two as subordinate subjects.

The whole examination may be taken in one year, or distributed over two or three years, provided the examination in any one subject be not divided.

For further details of the examination, application must be made to the Faculty before the above date.

The fee for the degree is $20; *in absentia*, $40. (In case of failure, the candidate may present himself in a subsequent year without further payment of fees.) The examination will be held in April in McGill College only. A candidate after fulfilling all the conditions ought to notify the Faculty of his desire to proceed to the degree at the next convocation.

Candidates who obtained the degree of B.A. before 1884 *may proceed to the degree of M.A. under the regulations in force previous to* 1884.

Lectures are open to Bachelors of Arts who are candidates for M.A., the sessional examinations corresponding to these lectures being reckoned as parts of the M.A. examination. The subjects are Greek, Latin, English, French, German, History, Mental and Moral Philosophy, Chemistry, Experimental Physics, Botany, Zoology, Geology and Mineralogy. Certificates of standing will be given.

Regulations for the Degree of M.Sc.

Bachelors of Arts or Bachelors of Science of at least one year's standing who shall have taken for one year a Graduate Course of Study in the Faculty of Arts or the Faculty of Applied Science of the University, previously submitted to and approved by the Faculty, shall have passed an examination at the end of the year, and shall, if required, have presented a satisfactory thesis; or Bachelors of Arts or Bachelors of Science of at least two years' standing who shall have presented a satisfactory thesis, and shall have passed a special examination for the degree, shall be entitled to the Degree of Master of Science.

The fee for the degree is $20; *in absentia*, $40.

Regulations for the Degree of M.D.

Students who shall have satisfactorily completed the Regular Course of Study in Medicine, shall have passed the prescribed examinations during the course, and also the special examinations for Graduation, shall be entitled to the Degree of Doctor of Medicine and Master of Surgery.

Regulations for the Degree of D.Litt.

Candidates for the Degree of Doctor of Literature must be Masters of Arts, of at least five years' standing, who shall have

distinguished themselves by special research and learning in the domain of Literature or Philosophy. They are required to present a satisfactory thesis or published work.

The fee for the degree is $80.

Regulations for the Degree of D.Sc.

Candidates for the Degree of Doctor of Science must be Masters of Arts or Masters of Science, or Doctors of Medicine, of at least five years' standing, who shall have distinguished themselves by special research and learning in the domain of Science. They are required to present a satisfactory thesis or published work.

The fee for the degree is $80.

Regulations for the Degree of D.C.L.

Candidates for the Degree of Doctor of Civil Law must be Bachelors of Civil Law of at least twelve years' standing. They are required to pass a special examination for the degree and to present a satisfactory thesis or published work on some subject selected or approved by the Faculty of Law. For details of the examination, etc., see pp.

The fee for the degree is $80.

Regulations for the Degree of LL.D.

Except as hereinafter mentioned, the Degree of Doctor of Laws is given only as an honorary degree.

Any person who matriculated and attended lectures in the Faculty of Arts before the 31st January, 1899, may proceed to the Degree of Doctor of Laws in course upon the following conditions:

Candidates for the Degree of LL.D., in course, must be Masters of Arts of at least twelve years' standing, and are required to prepare and submit to the Faculty of Arts, not less than three months before proceeding to the degree, twenty-five printed copies of a thesis on some Literary or Scientific subject which has been *previously approved by the Faculty*. The thesis must exhibit such a degree of literary or scientific merit, and give evidence of such originality of thought or extent of research as shall, in the opinion of the Faculty, justify recommendation for the degree.

Candidates are also required to submit, with their thesis, a list of books treating of some one branch of Literature or of Science satisfactory to the Faculty, in which they are prepared to submit to examination, and in which they shall be examined, unless otherwise ordered by the Faculty.

The fee for the degree in course is $80.

Admission "Ad Eundem Gradum."

The following are the regulations applicable to admission "ad eundem gradum":—

Extract from the Statutes, Chap. VIII.

"Graduates of other Universities, desirous of admission "to the like Degree in this University, may be so admitted "by the Corporation; due enquiry being first made as to "their moral character and sound learning, and opportunity "given to the several Faculties to make such representation "in the premises as they may see fit. Provided always, that, "unless by unanimous consent, such admission shall not "be put to vote until after three months' notice, and shall "not be ordered, if as many as five Members of the Corporation shall vote against it."

Extract from the Regulations of the Corporation.

"In all cases in which anyone is proposed for any 'Ad "Eundem' degree, it shall be necessary for the Member or "Members of the Corporation making such proposal, to state "in writing therewith the grounds upon which the granting "of such degree is advocated, and when the case shall be referred to the Faculties, under Chap. VIII. of the Statutes, "copies of such proposal and grounds shall be transmitted to "the Faculties by the Secretary for their consideration."

Note.—In considering applications under the above regulations, the Faculties will require as "grounds" the pursuit of a course of study or research in this University; association with the academic work of the University; or similar qualifications.

Admission "ad eundem gradum" is not granted merely as a titular distinction.

REGISTRATION AND PAYMENT OF FEES.

Registration.

1. At any time before the first day of lectures in each session, candidates entering on a course of study in the Faculties of Arts, Law, and Applied Science, whether as Undergraduates, Conditioned Students or Partial Students, are required to attend at the office of the University Registrar, for the purpose of filling out in duplicate the usual form of registration, and of signing the following declaration in the Matricula or Register:—

"I hereby declare that I will faithfully observe the Statutes, Rules and Ordinances of this University of McGill College to the best of my ability."

2. On the first day of lectures students of the Second, Third and Fourth Years in the Faculties of Arts, Law, and Applied Science shall register in such place or places as may be found most convenient, due notice of which shall be given.

3. After registering, the student will be given a registration ticket, on presentation of which to the different professors and lecturers whose classes he proposes to attend, his name will be entered in the Class Register. It will not be entered on any other condition.

4. Students who find it impossible to present themselves at the times specified in Regulations 1 and 2 must register as soon as possible thereafter, and will not be allowed to attend any lectures, until they have obtained their registration tickets.

Payment of Fees.

1. Fees must be paid in the office of the Bursar on or before October 1st. Students entering after October 1st must pay their fees at the time of registration. The Registration Ticket must be shown to the Bursar, in every case, before the fee is paid.

2. Immediately after the above date the Registrar shall send to each professor and lecturer a list containing the names of the registered students who have not paid their fees, on receipt of which the professor or lecturer shall strike the names of such students from the register of attendance.

3. Students whose names have been dropped from the class records on account of non-payment of fees can have them replaced, on presentation of a special ticket certifying that the fees have been paid. This ticket will only be issued on payment of an additional fee of two dollars.

FEES.

Matriculation fees must be sent to the University Registrar at the time of application for the examination. All other fees as well as all fines in the Faculties of Arts, Law, and Applied Science must be paid to the Bursar of the University; those in the Faculty of Medicine (with the exception of the Graduation fee) to the Registrar of that Faculty.

Matriculation Fees.

For the full Examination	$5 00
(In case of a Local Examination, where one candidate only is examined, the fee will be $10.)	
In case of candidates who do not complete the examination at one time, for the first examination	5 00
For any subsequent examination	2 00
For examination of certificates, other than A.A. Certificates, in respect of which candidates are exempted from the whole of the Matriculation Examination	1 00

Candidates who have passed the University School (A.A.) Examination in the required matriculation subjects, and desire to enter the University, are required to pay the same fee as that for the Matriculation Examination, viz., $5.00, less any sum already paid in connection with the A.A. Examination.

Certificates will, on application, be issued to successful candidates without additional fee. Duplicate certificates will not be granted unless satisfactory proof be given of the loss or destruction of the original. The fee for a duplicate certificate is $1.00.



Macdonald Physics Building.

Fees in the Faculty of Arts.

For Regulations re payment, see p. 27.

1. Undergraduates and Conditioned Students.—$61 per session. This will include the fee for Laboratory work, Library, Gymnasium and Athletics, and Graduation. In the Third and Fourth years, it will cover the normal amount of practical instruction given in each subject having a Laboratory Course.

Matriculation fee for entrance into the Second Year, $10, in addition to the sessional fee.

2. Partial Students.—(First and Second Years.)—$16 per session for one course or one half-course of lectures, including the use of the Library; $12 per session for each additional course ; $8 per session for each additional half-course. In addition there will be a fee of $3 for Athletics.

3. Partial Students.—(Third and Fourth Years.)—$22 per session for one course or one half-course of lectures, including the use of the Library ; $20 per session for each additional course ; $11 per session for each additional half-course. In addition there will be a fee of $3 for Athletics.

The lectures (and laboratory work, if any) in one subject in any of the four College years constitute a "Course," if occupying three hours per week, a "Half-Course" if occupying less than three hours per week.

Conditioned Students and Partial Students taking the full curriculum in any one year pay the same fees as Undergraduates in that year.

4. Graduates in Arts of this University and graduates of other Universities attending full courses in affiliated Theological Colleges are allowed, on payment of one-half of the usual fees, to attend all lectures, except those for which a special fee is exigible. For Bachelors of Arts proceeding to M.A. by taking for one year a graduate course of study, the fee is $40. This will cover Laboratory work.

5. Special Fees.—

SUPPLEMENTAL EXAMINATION, at the regular date fixed by the Faculty	2 00
SUPPLEMENTAL EXAMINATION, when granted at any other time than the regular date fixed by the Faculty	5 00

All fees for Supplemental Examinations must be paid to the Bursar, and the receipts shown to the Dean before the examination.

6. Caution Money.—Every student is required to deposit with the Bursar the sum of $5, as caution money, to cover damage done to furniture, apparatus, books, etc. This amount, less deductions (if any), will be returned at the close of the session.

7. Summer Classes.—During the months of May and June, a series of SUMMER CLASSES will be conducted, intended mainly in the first instance, to meet the requirements of students in the first two years of their course. The subjects offered are English, Latin, Greek, Mathematics, Physics, Chemistry, Logic, French and German. A fee of eight dollars will be exigible for any one class, and of four dollars for each additional class.

All fines are applied to the purchase of books for the Library.

Fees in the Faculty of Applied Science.

For Regulations re payment, see p. 27.

Annual fee for the undergraduate course.....$175.00

(Undergraduates and conditioned students who were in attendance at the University during the Session of 1902-1903, or previously, will be allowed to complete their several courses on payment of $156.00 per annum. Should, however, any student repeat a year the fee for such additional session will be $175.00).

Students taking the Double Course in the Faculties of Arts and Applied Science shall receive a rebate on the Faculty of Applied Science fees of an amount equal to the fees paid for equivalent subjects in the Faculty of Arts.

The fees for Partial Students are :—$10.00 for Library, Athletics and Caution money ; and a fee at the rate of $6.00 per annum for each hour of instruction per week, but the maximum fee shall in no case exceed $175.00.....

Deposit for caution money for undergraduates and conditioned students 5.00

Fee for Graduate Course..... 150.00

(Graduates of this Faculty will be required to pay only one-half of this amount.)

Sessional fee for the Special Course on Architectural Styles (for partial students)..... $10.00

Supplemental Examinations.—The fee is $2.00 for each examination period (morning or afternoon). It must be paid to the Bursar of the University not later than the day before the examinations, and receipt for the same shown to the Professor in charge before the examination papers are distributed.

The fee for a special Supplemental Examination is $5.00.

Summer Term Art Classes (see p. 192).

Full Term.—$25.00, whole day; $15.00, *half day.

One month of 4 weeks, commencing any time during the term; $15.00, whole day; $9.00, *half day.

Note.—Any period more than a month, but less than the term, will be charged for at the rate per month.

Fees in the Faculty of Medicine.

All fees are payable in advance to the Registrar, and, except by permission of the Faculty, will not be received later than October 20th.

It is strongly recommended to parents or guardians of students that the fees be transmitted direct by cheque or P.O. Order to the Registrar, who will furnish official receipts.

The total Faculty Fees for the whole medical course of four full sessions, including clinics, laboratory work, dissecting material and reagents, will be *five hundred dollars*, payable in four annual instalments of $125 each.

Partial students will be admitted to one or more courses on payment of special fees. An annual University fee of three dollars is charged students of all the faculties for the maintenance of college grounds and athletics.

Students repeating the course of study of any Academic session are not required to pay full fees. A fee of thirty-five dollars will be charged, which will include Hospitals, dissecting material, chemical reagents, laboratory fees, etc. The same fee is charged students entering from other colleges who have already paid fees elsewhere for the courses taken.

* Half day means mornings and afternoons, not interchangeable.

An *ad eundem gradum* fee of $10 will be charged students entering from another university in the second, third or fourth year of the course.

Special Fees.—Annual tickets entitling students to admission to both the Montreal General and the Royal Victoria Hospitals must be taken out at the commencement of the session.

For the convenience of the undergraduates, the Hospital fees are payable in the Registrar's office ; ten dollars to be paid at the beginning of each of the last three sessions, viz., the second, third and fourth years. This will entitle each undergraduate to perpetual tickets for both the Montreal General and Royal Victoria Hospitals.

The fee for the Maternity Hospital for twelve months is $12, payable at the Hospital.

The fee for the Degree of Doctor of Medicine and Master of Surgery shall be thirty dollars, to be paid by the successful candidate to the University Bursar immediately after examination.

The following fees are exigible in the different graduate courses offered:—

Regular Graduate Course (including Hospital fees)..	$40.00
(Special fees will be arranged for single courses.)	
Course in Legal Medicine, and Diploma.....	$20.00
Course in Public Health, and Diploma.....	$20.00

Fees in the Faculty of Law.

For Regulations re payment, see p. 27.

Registration Fee	$ 5 00
Sessional Fee (including Athletics) for Undergraduates matriculating in and after September, 1903.....	60 00
Sessional Fee for Undergraduates previously enrolled..	53 00
Athletics Fee, payable by Partial Students.....	3 00
Graduation Fee	12 50

Sessional Fee by Partial Students:—for the course of Roman Law, $20 ; for each of the courses on Successions, Criminal Law, Commercial Law, Obligations and Civil Procedure, $15 ; and for each one of the shorter courses, $10.00.

Caution Money.—Every student is required to deposit with the Bursar the sum of $5, as caution money, to cover damage done to furniture, loss of books, etc. This amount, less deductions, (if any), will be returned at the close of the session.

Fees for Higher Degrees.

For the Degree of M.A.	$20.00
" " " (*In absentia*)	40.00
(In case of failure on examination or the rejection of the thesis the candidate may present himself in a subsequent year without further payment of fee.)	
For the Degree of M.Sc.	$20.00
" " " (*In absentia*)	40.00
" " D.Sc.	80.00
" " D.Litt.	80.00
" " D.C.L.	80.00
" " LL.D. (in course)	80.00

No fee shall be charged for the Degree of LL.D., granted "honoris causa."

The fee for any Higher Degree must be sent with the thesis to the Registrar of the University. This is a condition essential to the reception of the application. The Registrar will then forward the thesis to the Dean of the Faculty. If no thesis be required, the fees must be paid before the Examination.

Miscellaneous Fees.

Elocution (optional)	$5.00
Library (optional for students in Law and Medicine)	4.00
Gymnasium (optional for undergraduates in Law and Medicine, and also for Partial Students in all Faculties)	2.50
Certificate of Standing, as to year of Course	1.00
Certificate of Standing, accompanied by a statement of classification in the several subjects of examination	2.00

All applications for certificates must be addressed to the Registrar of the University, accompanied by the required fee.

No certificates are given for attendance on lectures unless the corresponding examinations have been passed.

SPECIAL REGULATIONS.

Academic Dress.

Professors, Lecturers, and Students are required to wear academic dress at lectures, except in those cases in which a dispensation shall have been granted by the Faculty.

Undergraduates shall wear a plain black stuff gown, not falling below the knee, with round sleeve cut above elbow.

Bachelor of Arts.—Black stuff gown, falling below knee, with full sleeve cut to elbow and terminating in a point (similar to that of the Cambridge B.A.); hood, black silk, lined with pale blue silk and edged with white fur.

Bachelor of Science.—The same gown as Bachelors of Arts; hood, black silk, lined with yellow silk and edged with white fur.

Bachelor of Civil Law.—The same gown as Bachelors of Arts; hood, black silk, lined with French grey silk and edged with white fur.

Master of Arts.—Black gown of stuff or silk falling below knee, with long sleeve with semi-circular cut at the bottom; (similar to that of the Cambridge M.A.); hood, black silk, lined with pale blue silk.

Master of Science.—The same gown as Masters of Arts; hood, black silk, lined with yellow silk.

Doctor of Medicine.—The same gown as Masters of Arts; hood, scarlet cloth, lined with dark blue silk.

Doctor of Laws.—The same gown as Masters of Arts; hood, scarlet cloth, lined with white silk.

Doctor of Literature.—The same gown as Masters of Arts; hood, scarlet cloth, lined with pale blue silk.

Doctor of Science.—The same gown as Masters of Arts; hood, scarlet cloth, lined with yellow silk.

Doctor of Civil Law.—The same gown as Masters of Arts; hood, scarlet cloth, lined with French grey silk.

Doctors of Laws, Doctors of Civil Law, Doctors of Literature, and Doctors of Science shall be entitled to wear for full dress a robe of scarlet cloth (similar in pattern to that of the Cambridge LL.D.) faced with silk of the same colour as the lining of their respective hoods.

All hoods shall be in pattern similar to that of the Masters of Arts of Cambridge University.

Undergraduates and graduates shall wear the ordinary black trencher with black tassel, but Doctors of Laws, Doctors of Civil Law, Doctors of Literature, and Doctors of Science shall wear for full dress a black velvet hat with gold cord, similar to that worn by Doctors of Laws of Cambridge University.

Samples of the colours of the linings of all hoods shall be kept for inspection in the office of the Registrar.

Attendance and Conduct.

1. Punctual attendance on all his classes is required of each student.

2. A record shall be kept by each Professor or Lecturer, in which the presence or absence of students shall be carefully noted. The record shall be submitted to the Faculty at all their ordinary meetings during the Session.

3. Credit for attendance on any lecture or class may be refused on the grounds of lateness, inattention, neglect of study, or disorderly conduct in the class-room or laboratory. In the case last mentioned, the student may, at the discretion of the Professor, be required to leave the room. Persistence in any of the above offences against discipline shall, after admonition by the Professor, be reported to the Dean of Faculty. .The Dean may, at his discretion, reprimand the student, or refer the matter to the Faculty at its next meeting, and may in the interval suspend from classes.

4. Absence from lectures can only be excused by necessity or duty, of which proof must be given, when called for, to the Faculty. The number of times of absence, from necessity or duty, that shall disqualify from the keeping of a session shall in each case be determined by the Faculty.

5. Any student found guilty of dishonest practices at an examination shall be liable to expulsion from the University, or to be suspended for a term of years.

6. While in college, or going to or from it, students are expected to conduct themselves in the same orderly manner as in the class-rooms. Smoking is prohibited in the College buildings, except in such rooms, if any, as may be set apart for that purpose. Any Professor observing improper conduct in the College buildings or grounds may admonish the student, and, if necessary, report him to the Dean. Without, as well as within the walls of the College, every student is required to maintain a good moral character.

7. When students are brought before the Faculty under the above rules, the Faculty may reprimand, report to parents or guardians, impose fines, disqualify from competing for prizes or honors, suspend from classes, or report to the Corporation for expulsion.

8. Any student damaging the furniture or buildings will be required to bear the expense of repairing or making good

the same, and will, in addition, be subject to such other penalty as the Faculty may see fit to inflict. If individual responsibility for damage cannot be traced, a *pro rata* assessment may be made on all the students more directly concerned.

9. All cases of discipline involving the interests of more than one Faculty, or of the University in general, shall be immediately reported to the Principal, or, in his absence, to the Vice-Principal.

10. Petitions from the students to any University body on any subject can, in general, be taken into consideration only at the regular meetings appointed in the Calendar.

Conduct of Examinations.

1. The supervision of the examinations of the University is entrusted largely to officers specially appointed from year to year in sufficient numbers for the purpose. An attendant is present in the Examination Hall throughout each examination.

2. Writing paper for the examinations is provided in the form of books, with covers in special colours. Each book contains a statement of the duties of candidates, and to each is attached a small envelope containing a card or slip for the name of the candidate.

3. Each colour has a number, and only one colour is employed at a given examination. A certain scheme of colours is arranged beforehand for the whole period of the examination.

4. The seating of the students is arranged in advance, and is posted at the entrance of the Hall fifteen minutes before the commencement of the examination.

5. The Faculty, or a Committee of the Faculty concerned, will arrange for at least one examiner, and such other paid examiners as are deemed necessary, to be present in the Hall for each examination ; and will also arrange the scheme of seating and books to be used.

6. All examiners are expected to attend strictly to the supervision of the examinations while they are in the Hall.

7. They shall instruct each candidate to write the number of his table on the outside of his book ; to write his name plainly upon the card provided in the envelope on the book ; to replace it and seal the envelope.

After this has been done, the examination papers are distributed. Any candidate entering late will be required to sign his card and close the envelope before receiving the examination paper.

The examiners shall also call the attention of the candidates to the rules printed upon the envelope.

8. During the course of the examinations the examiner shall verify the position of each candidate in the examination hall according to a plan.

9. For the convenience of candidates, the examiners may announce the time when half of the period allowed for the examination has expired ; and also at thirty minutes and five minutes before the close.

10. Before beginning to write on the examination, candidates should write their names plainly on the slip provided in the envelope, and enclose it, fastening the envelope, and write the number of their desk or table plainly on the cover of the examination book.

11. No candidate shall be permitted to enter the examination room after the expiry of one-half hour, or leave it before the expiry of one-half hour, from the commencement of the examination. Any candidate leaving the examination room after the issue of the examination papers in any subject, shall not be permitted to return during the course of that examination.

12. Candidates guilty of any of the following or similar dishonest practices shall be immediately dismissed from the examination, and shall be liable to permanent disqualification for membership in McGill University:—

A. Making use of any books, papers, or memoranda, other than those provided by the examiners.

B. Speaking or communicating with other candidates under any circumstances whatever.

C. Exposing written papers to the view of other candidates.

The plea of accident or forgetfulness shall not be received.

13. Candidates shall write their answers on the right hand pages of the Regulation Answer Book provided for the purpose by the University, entering on the margin nothing but the number or letter of the question they are about to answer. The left-hand page may be used for rough drafts or for scrib-

bling purposes. No other paper than the regulation answer book above mentioned shall be used by the candidates, and no pages removed from the books.

14. Candidates are not permitted to leave their places. Should they desire anything, they may signify it by standing up.

15. When the examiner announces that the examination is over, all candidates must leave the hall. On leaving the hall, the examination books must be deposited by the candidates as directed by the examiners.

College Grounds and Athletics.

All matters relating to the management of the College Grounds and of Out-Door Athletics and Sports are under the control of a Committee consisting of :—

One Governor.
The Principal.
One Member of the Faculty of Arts.
One Member of the Faculty of Applied Science.
One Member of the Faculty of Law.
One Member of the Faculty of Medicine.
One Graduate.
One Undergraduate, member of the Football Club.
One Undergraduate, member of the Tennis Club.
One Undergraduate, member of the Cricket Club.
One Undergraduate, member of the Hockey Club.
One Undergraduate, member of the Skating Club.
The President of the Athletic Association.

The several Members of the Committee are elected annually by their respective bodies ; and the Committee meets for organization on the third Tuesday in September in each year. The Undergraduate Members of the Committee are entitled to vote only on matters relating to Athletics.

The following extracts are made from the rules and regulations of the Committee, for the guidance of Members of the University and the several Athletic Clubs and Associations which are from time to time permitted to use the grounds :

The University and McTavish Street gates shall be closed between 6 p.m. and 7 a.m. on week days and the whole day on Sunday.

The Sherbrooke Street gates shall be closed between 10 p.m. and 6 a.m.

Such persons as are entitled to use the Grounds shall be provided with tickets renewable each year.

Those entitled to tickets are the Members of the University and prominent Benefactors, and the families of Governors and Professors.

The several Clubs shall be permitted to issue special tickets, entitling the holders to admission to the Grounds for the purpose of viewing matches, or for other special occasions of public interest.

All students desirous of taking part in football matches, or otherwise engaging in violent athletic contests, must pass a medical examination, to be held under the direction of the Superintendent of the Gymnasium. A complete record of all such examinations shall be kept by the Superintendent or other officer appointed to this duty. The Managers and Captains of Clubs or other responsible executive officers are required to insist upon the strict observance of the rule in regard to Medical Examination, and all the rules and regulations of the Committee which concern them.

All Clubs must submit their Regulations, Rules, and By-Laws, and any changes in the same, for the approval of the Committee. They must make application for the use of such portions of the Grounds as they require, and for any special privileges.

Clubs must not engage in matches with outside clubs except with the approval of the Committee.

The Athletic Association must submit its programme for each year for the approval of the Committee.

All students of the University are required to pay a fee of three dollars ($3.00) for the use of the Grounds. The amount so paid is handed over to the Committee, and is by it expended in the interest of College Athletics and in the permanent improvement of the portions of the grounds used for Athletics.

UNIVERSITY BUILDINGS.

The Centre Building.

This building, the first and oldest building of McGill College, contains the lecture-rooms of the Faculty of Arts and the Botanical Laboratories in the centre. The East Wing contains the newly equipped Zoological Laboratories, the offices of the Administration, and the lecture-rooms of the Faculty of Law. The West Wing comprises the Molson Convocation and Examination Hall and the Corporation Meeting-room.

The Botanical Laboratories are described in detail on p. 128, the Zoological Laboratories on p. 129.

The Macdonald Engineering Building.

The Engineering Building, erected, equipped and endowed by Sir William C. Macdonald, represents, in architectural effect, a severe treatment of the Italian renaissance. Besides numerous lecture-rooms, students' rooms, a departmental library, and a large technical museum, which holds the Reuleaux collection of Kinematic models—believed to be the most complete in America, the building contains large and thoroughly equipped electrical and magnetic laboratories; dynamo rooms; lighting station; accumulator room; laboratories of Mathematics, Dynamics, Mechanics, Geodesy, Modelling, Testing, and Thermodynamics; workshops (in the annex erected under the bequest of the late Thomas Workman) for Carpentry, Wood-turning, and Pattern-making; Machine shops; Smithy; Foundry, etc.

The whole of one floor is given up to Drawing-rooms, and the Museum of the building contains a large collection of casts illustrative of the historical development of the various styles of architecture and of casts of architectural and figure sculpture.

A detailed description of the laboratories and workshops and their equipment is given on pp. 193 *et seqq*

Macdonald Chemistry and Mining Building.

Admirable facilities are afforded in the Macdonald Chemistry and Mining Building for study and research in the departments of Chemistry, Metallurgy, Mining, Mineralogy and Geology. The building was erected, equipped and endowed by Sir William C. Macdonald. It is spacious, admirably lighted, heated by hot water and ventilated by electric fans. In addition to the large Lecture Theatre, which seats about 250 students, there are four lecture rooms for smaller classes, and a number of offices.

There are three large general Chemical Laboratories, large laboratories for Ore-dressing and Metalurgy and a number of smaller rooms for special purposes, including research work. Among the special laboratories may be mentioned those for Organic Chemistry, Physical Chemistry, Electrolytic Analysis, Gas Analysis, Iron and Steel Analysis, Fire Assaying, Water Analysis, Determinative Mineralogy, Petrography, Photography, etc. The reference library contains about 1,300 volumes.

A detailed description of the laboratories and their equipment is given on pp. 127 and 193.

The Macdonald Physics Building.

The Macdonald Physical Labratory, another of Sir William C. Macdonald's gifts to the University, contains five storeys, each of 8,000 square feet area. Besides a lecture theatre and its apparatus rooms, the Building includes an elementary laboratory nearly 60 feet square; large special laboratories arranged for higher work by advanced students in Heat and Electricity; a range of rooms for optical work and photography; separate rooms for private thesis work by students; and two large laboratories arranged for research, provided with solid piers and the usual standard instruments. There are also a lecture room, with apparatus room attached, for Mathematical Physics, a special physical library, and convenient workshops. The equipment is on a corresponding scale, and comprises: (1) apparatus for illustrating lectures; (2) simple forms of the principal instruments for use by the students in practical work; (3) the most recent types of all important instruments for exact measurement, to be used in connection with special work and research.

A detailed description of the laboratories and their equipment is given on pp. 125 and 201.

Medical Buildings

The present main building of the Faculty of Medicine was erected in 1873. In 1885, and again in 193, large additions and alterations were made to the buildings. These again, however, have proved inadequate, and a thorough reconstruction and enlargement of the buildings has lately been completed. The present buildings comprise several large lecture theatres; a large reading room, managed by the students themselves; a fine medical library; dissecting rooms; and a large number of completely equipped laboratories for Physiology, Histology, Pharmacology, Chemistry, Hygiene, Bacteriology, and Pathology, in addition to numerous museums, preparation rooms, and offices. Clinical teaching is conducted in the theatres, wards, outpatient rooms, and laboratories of the Montreal General Hospital, the Royal Victoria Hospital, and the Montreal Maternity Hospital.

A detailed description of the laboratories and museums is given on pp. 237 to 240 and 281 to 285.

The Royal Victoria College for Women.

This residential college for the Women Students of McGill University, erected and endowed by Lord Strathcona and Mount Royal, is situated on Sherbrooke Street, in close proximity to the University buildings and laboratories. The Professors and Lecturers of the University are thereby enabled to give their services in the conduct of the College classes.

Full particulars of the College, terms of residence, etc., are given on pp. 136 *et seqq.*

The University Library.

Librarian:—Chares H. Gould, B.A.

The general library is housed in the fine Romanesque building erected in 1893 by the late Mr. Peter Redpath.

Dignified and convenient as originally designed, it has recently been improved and greatly enlarged by the liberality of Mrs. Peter

Redpath. It now possesses ample accommodation for three hundred and fifty readers, of whom fully one hundred can be provided for in the seminary rooms and special studies.

The main architectural feature of the interior is the general reading room, 110 feet long, 43 feet wide, and 44 feet high. It will seat one hundred and fifty readers and has open shelves for about 4,000 volumes.

The book stack, four and five storeys high, of approved type, excellently lighted and ventilated, with four reading bays on each storey, has a working capacity of 250,000 volumes, besides special provision for the storage of maps and of newspapers.

Library regulations, with a description of the collections are given on pp. 295 to 298.

The Peter Redpath Museum.

Senior Curator—Prof. B. J. Harrington, M.A., LL.D.

This building was erected in 1882 by the liberal benefactor whose name it bears. It occupies a commanding position at the upper end of the campus, and besides its central hall and other rooms devoted to the collections, contains a large lecture theatre, class-rooms, and work-rooms.

The general arrangement of the collections is as follows:—

1. The Botanical Room on the ground floor contains the Herbarium, consisting of 30,000 specimens of Canadian and exotic plants and collections illustrating structural and economic botany.

2. On the first floor is a room over the entrance hall, in which are cases containing archaeological and ethnological objects with large slabs of fossil foot-prints on the walls.

3. This room opens into the great Museum Hall, on each side of which are alcoves with upright and table cases containing the collections in Palaeontology, arranged primarily to illustrate the successive geological systems, and subordinately to this, in the order of zoological and botanical classification, so as to enable the student to see the general order of life in successive periods, and to trace any particular group through its geological history.

4. At the extreme end of the Hall are placed the collections of minerals and rocks, arranged in such manner as to facilitate their systematic study. In the centre of the Hall are economic collections and large casts and models.

5. In the upper story or gallery of the great Hall are placed the zoological collections; the invertebrate animals in table cases in regular series, beginning with the lower forms; the vertebrate animals in upright cases, in similar order. The PHILIP CARPENTER COLLECTION of shells is especially noteworthy for its arrangement and completeness.

Details as to the several departments of the Museum are given in the "Museum Guide," and papers or memoirs relating to type specimens in the collections can be obtained from the Museum Assistant. Tickets are issued to students by the Professors in charge of the several departments, and classes of pupils from schools can be admitted on certain days under regulations which may be learned from the Professors or from the Registrar of the University.



University Library.—Main Reading Room.



Redpath Museum.—Interior View.

Observatory.

Latitude, N. 45° 30′ 17″. Longitude, 4h· 54m· 18s· 67.

Height above sea level, 187 feet.

Superintendent—C. H. McLeod, Ma.E.

The Observatory in which courses of instruction are given in the use of meteorological instruments and in astronomical work, is situated at the head of the University campus.

Meteorological observations.—Records of temperature, atmospheric pressure, wind velocity and direction, and sunshine are obtained by self-recording instruments. Check observations are made at 7.40 a.m., 3 p.m., and 7.40 p.m. on standard instruments.

The principal instruments employed are two standard mercurial barometers; one Richard barograph; one Richard thermograph; one Callendar thermograph; one Kew standard thermometer; two Pastorelli thermometers; one maximum thermometer; one minimum thermometer; one set of six self-recording thermometers, with controlling clock, battery, etc.; two anemometers; one wind vane; one anemograph with battery, etc.; one sunshine recorder; one rain-band spectroscope and one rain gauge.

The Anemometer and Vane are on the summit of Mount Royal, at a point about three-quarters of a mile north-west of the Observatory. They are 57 feet above the surface of the ground and 810 feet above sea level.

Soil temperatures are observed, in co-operation with the Physical Laboratory, by means of platinum thermometers at depths ranging from one inch to nine feet.

The astronomical equipment consists of:—The Blackman Telescope (6¼ in.); a photoheliograph (4½ in.); a 3¼ in. transit with striding level, etc.; a prismatic (8cm.) transit instrument, also arranged as a zenith telescope; a 2 in. transit in the prime vertical; two collimating telescopes; one sidereal clock; one mean time clock; one sidereal chronometer; one mean time chronometer; one chronograph; batteries, telegraph lines, and sundry minor instruments.

Observations for clock errors are made on nearly every clear night. Time exchanges are regularly made with the Toronto observatory. Time signals are distributed throughout the city by means of the noon time-ball, continuous clock-signals, and the fire-alarm bells; and to the country through the telegraph lines.

The longitude of the Observatory was determined in 1892 by direct telegraph connection with Greenwich, with exchange of observers and instruments. The position is believed to be the most accurately determined in America.

Gymnasiums.

The University Gymnasium.

Medical Director of Physical Training:—R. Tait McKenzie, B.A., M.D.

The classes, which are open to men students of all the Faculties, will meet at the University Gymnasium at hours to suit, as far as possible, the convenience of students, and to be announced at the commencement of the Session.

The recent addition of some special apparatus enables the instructor to devote some attention to the application of exercise in treating special cases of weakness or deformity, whch should be reported to him before the regular class work is undertaken.

THE WICKSTEED SILVER AND BRONZE MEDALS FOR PHYSICAL CULTURE (the gift of Dr. R. J. Wicksteed) are offered for competition to students of the graduating class and to students who have had instruction in the Gymnasium for two sessions; the silver medal to the former, the bronze medal to the latter.

The award of these medals is made by Judges, appointed by the Corporation of the University.

Every competitor for the silver medal is required to lodge with the Judges, before the examination, a certificate of good standing in the graduating class signed by the Dean or Registrar of the Faculty to which he belongs, and the medal will not be awarded to any student who may fail in his examination for the degree.

The Royal Victoria College Gymnasium.

Instructor:—Miss Vendla M. Holmstrom.

Classes for Women Students are conducted in the newly equipped Gymnasium of the Royal Victoria College, see page 138.



Arts Building.

Faculty of Arts.

THE FIRST DAY OF LECTURES, SESSION 1903-1904, WILL BE TUESDAY SEPTEMBER 22ND.

I. REGULATIONS FOR ENTRANCE.

See pp. 10–21.

II. FEES AND REGISTRATION.

See pp. 27–30.

III. SCHOLARSHIPS AND EXHIBITIONS*.

GENERAL REGULATIONS.

1. A Scholarship is tenable for *two* years; an Exhibition for *one* year.

2. Scholarships are open for competition to students who have passed the University Intermediate Examination, provided that not more than three sessions have elapsed since their Matriculation; and also to candidates who have obtained what the Faculty may deem equivalent standing in some other University, provided that application be made before the end of the Session preceding the examination. For details of the examination, see pp. 55–57.

3. Exhibitions are assigned to the First and Second Years.

First Year Exhibitions are open for competition to candidates for entrance into the First Year. The examination is held in June. For details, see pp. 47–53.

Second Year Exhibitions are open for competition to students who have passed the First Year Sessional Examinations, provided that not more than two sessions have elapsed since their Matriculation; and also to candidates for entrance into

* In Session 1903-1904 the Scholarship and Second Year Exhibition Examinations will begin on Wednesday, September 9th.

the Second Year. The examination is held at the beginning of every session, in September. For details, see pp. 53–55.

4. The Second Year Exhibition Examination will, for candidates who have not previously entered the University, be regarded as a Matriculation Examination.

5. No student can hold more than one Exhibition or Scholarship at the same time.

6. Exhibitions and Scholarships will not necessarily be awarded to the candidates who have obtained the highest marks. An adequate standard of merit will be required.

7. If in any College Year there be not a sufficient number of candidates showing adequate merit, any one or more of the Exhibitions or Scholarships offered for competition may be given to more deserving candidates in another year.

8. A successful candidate must, in order to retain his Scholarship or Exhibition, proceed regularly with his College Course to the satisfaction of the Faculty.

9. The annual income of the Scholarships or Exhibitions will be paid in four instalments, viz.:—In October, December, February and April, about the 20th day of each month.

10. For the Session of 1903-1904 there will be thirty-one Scholarships and Exhibitions, including the following:—

The Jane Redpath Exhibition, founded by Mrs. Redpath, of Terrace Bank, Montreal:—value, about $90 yearly, open to both men and women.*

Ottawa Valley Graduates' Society Exhibition, awarded on the results of the June Examination.

Two Sir William Dawson Exhibitions, given by the New York Graduates' Society:—value, one $62 and the other $60 yearly.

Ten Macdonald Scholarships and Exhibitions, founded by Sir W. C. Macdonald, Montreal:—value $125 each, yearly.

The Charles Alexander Scholarship, (for men students), founded by Charles Alexander, Esq.,. Montreal, for the encouragement of the study of Classics and other subjects:—value $90 yearly.

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* Resolutions are now in force by which all Exhibitions and Scholarships have been thrown open without restriction of sex, "except in cases where the deeds of gift or the ascertained wishes of the donor expressly preclude such a course; it being understood that in the event of the establishment of any large number of Exhibitions and Scholarships specially appropriated to either of the sexes by the terms of the foundation, the Board of Governors may again restrict some of those now existing in favour of the other sex."

The Major H. Mills Scholarship, founded by bequest of the late Major Hiram Mills:—value $100 yearly.

The Barbara Scott Scholarship, founded by the late Miss Barbara Scott, Montreal, for the encouragement of the study of the Classical languages and literature:—value $100 to $120 yearly.

The Mackenzie Scholarship for Economics and Political Science, founded in memory of the late Hon. Alexander Mackenzie:—value $125 yearly.

Four Exhibitions in the Royal Victoria College, open to women only:—ranging in value from $75 to $200 yearly.

One Royal Victoria College Scholarship, for women:—value $125 yearly.

RESEARCH SCHOLARSHIP IN CHEMISTRY.

It is proposed to offer in September, 1904, a Research Scholarship in Chemistry, on the endowment of the late Dr. T. Sterry Hunt, to graduate students in the Faculties of Arts and Applied Science.

FIRST YEAR EXHIBITIONS.

First Year Exhibitions.

The following nineteen Exhibitions are offered for competition in June, 1903, to candidates for admission to the First Year:

Three **C** (Advanced), each of $300.

For particulars, see pp. 51–53.

(Not transferable to other divisions below or other years.)

Five **B** (Higher), each of $150.

For particulars, see pp. 48–51.

(Any or all of these may be raised to $200, if the answering is sufficiently good, and if there be other Exhibitions unawarded.)

Five **A** (Ordinary Matriculation, B. A. course), viz., two of $125 each; three of $100 each.

Four **A** (Ordinary Matriculation, B. Sc. course), viz., one of $112; two of $100; one of $60.

Two R. V. C. Exhibitions for Ordinary Matriculation, open to women only, and conditional on residence in the Royal Victoria College, viz., one of $200, and one of $100.

As previously announced, the examination for First Year Exhibitions will be held hereafter in June, instead of September, beginning June 8th, 1903.

There will be three divisions, **A**, **B** and **C**.

They are open to men and women on equal terms, unless the contrary is stated.

No candidate can hold two exhibitions at the same time.

Blank forms of application, to be obtained from the Registrar of the University, must be filled out and returned before the 1st of May, 1903.

In his application the candidate will specify the degree (B. A. or B. Sc.) to which he intends to proceed. The tenure of an Exhibition is conditional on the pursuit of the corresponding curiculum in the First Year.

A. EXHIBITIONS.

The **A** (Matriculation) Exhibitions will be awarded on the results of the Matriculation Examination only, whether for B.A. or B.Sc. The marks for English Grammar, Composition, Dictation, Arithmetic and British History will not be taken into account, however, in the competition, and candidates who have previously passed in these subjects will not be required to repeat the examination.

(For details of requirements in the different subjects, see pp. 15–19.

B. EXHIBITIONS.

The **B** (Higher) Exhibitions will be awarded on the results of an examination in the subjects required for Matriculation, together with additional work in any *three* of the following; provided, however, that the Ordinary Matriculation papers in the three chosen have also been taken:—

English.
Latin.
Greek.
French.
German.
Mathematics, Part II (if not taken for Matriculation).

A candidate, not successful, may nevertheless receive an A Exhibition, but in determining this, the marks for the additional work will not be taken into account.

The details of the additional work in the above subjects are as follows:—

English.

Grammar.—An advanced knowledge of this subject will be required, and, in addition, some acquaintance with the histor-

ical development of English as illustrated in common and important words. The candidate is recommended to read Mason's or West's Elements of English Grammar, and expected to supplement Mason or West by using Morris's Historical Outlines of English Accidence (Macmillan & Co.) as a book of reference.

Literature, 1903 and 1904.—Milton, L'Allegro and other short poems, ed. Bell (Macmillan & Co.); Macaulay, Essays on Byron, Warren Hastings, Clive.

Composition.—The candidate will be required to write an essay on some subject connected with the examination.

Provided two months' notice be given, candidates may substitute in any year an equivalent amount from the works prescribed for the Senior Leaving Examination of the Province of Ontario, Grade XII of the Province of Nova Scotia, or the Senior Leaving Examination of the Prince of Wales College, P.E.I.

Latin.

Grammar; Translation at Sight; Prose Composition.

TEXT-BOOKS.—Sonnenschein's *or* Allen and Greenough's Latin Grammar; Arnold's Latin Prose Composition by Bradley, *or* Collar's Latin Composition, Parts III and IV.

Translation from the following prescribed books:—

1903 and 1904—Horace, Odes III.

1905—Horace, Odes I.

Provided two months' notice be given, candidates may substitute in any year an equivalent amount from the works prescribed for the Senior Leaving Examination of the Province of Ontario, Grade XII of the Province of Nova Scotia, or the Senior Leaving Examination of the Prince of Wales College, P.E.I.

Greek.

Grammar; Translation at Sight; Prose Composition.

TEXT-BOOKS.—Sonnenschein's *or* Rutherford's Greek Grammar, *or* Burnet's Greek Rudiments, *or* White's First Greek Book; Abbott's Arnold's Greek Prose Composition.

Translation from the following prescribed books:—

1903, 1904 and 1905.—Homer, Odyssey VII; Euripides, Hecuba (Sidgwick's Selections).

Provided two months' notice be given, candidates may substitute in any year an equivalent amount from the works prescribed for the Senior Leaving Examination of the Province of Ontario, Grade XII of the Province of Nova Scotia, or the Senior Leaving Examination of the Prince of Wales College, P.E.I.

In both Latin and Greek, candidates who do not offer the books prescribed above will have the option of an additional paper in Composition and Translation at Sight.

French.

(*a*) Grammar, including Syntax; (*b*) Translation at sight of French into English; (*c*) Translation at sight of easy English prose passages into French; (*d*) Translation from the following texts:—

1903. Sarcey, Le Siège de Paris (Heath & Co.); Sandeau. Mademoiselle de la Seiglière (Heath & Co.); About, Le Roi des Montagnes (Heath & Co.)

1904. Augier, Le Gendre de M. Poirier (Heath & Co.); DeVigny, La Canne de Jonc (Heath & Co.); Sand, La Mare au Diable (Heath & Co.)

Provided two months' notice be given, candidates may substitute in any year an equivalent amount from the works prescribed for the Senior Leaving Examination of the Province of Ontario, Grade XII of the Province of Nova Scotia, or the Senior Leaving Examination of the Prince of Wales College, P.E.I.

German.

(*a*) Grammar.— Accidence and Syntax; (*b*) Translation at sight from German into English; (*c*) Translation at sight into German of an easy passage of English prose; (*d*) Translation and grammatical study of the following texts:—

1903. Sudermann, Der Katzensteg (Heath & Co.); Schiller, Wilhelm Tell (Macmillan & Co.), or Leander, Träumereien (Copp, Clark Co.); Gerstaecker, Germelshausen (Heath & Co.)

1904. Schiller, Maria Stuart (Heath & Co.); Freytag, Die Journalisten (Heath & Co.); Keller, Kleider machen Leute (Heath & Co.).

Provided two months' notice be given, candidates may substitute in any year an equivalent amount from the works pre-

scribed for the Senior Leaving Examination of the Province of Ontario, Grade XII of the Province of Nova Scotia, or the Senior Leaving Examination of the Prince of Wales College, P. E. I.

Mathematics, Part II.

Geometry.—Euclid's Elements, Books IV and VI, with definitions of Book V, and easy deductions.

Algebra.—The three Progressions, Ratio, Proportion, Variation, Permutations and Combinations, Binomial Theorem, Logarithms, Interest and Annuities, as in Hall & Knight's Elementary Algebra, omitting Chapters 36, 40, 41, 42, or in similar text-books.

Trigonometry.—Measurement of Angles, Trigonometrical ratios or functions of one angle, of two angles and of a multiple angle, as in Hamblin Smith, pp. 1-105, or as in Lock's Elementary Trigonometry, Chapters I-XII, or in similar text-books.

C. EXHIBITIONS.

Examination in Special Courses.

In awarding the C (Advanced) Exhibitions, the marks for Ordinary Matriculation will not be taken into account. A pass in the subjects chosen will, however, count towards matriculation, and in order to complete his matriculation, a candidate will take the ordinary papers in the remaining subjects required.

Candidates who have previously taken the matriculation examination in this University, or who matriculate on certificates, will not be required to take the ordinary papers.

A candidate, not successful, may nevertheless receive a B or an A Exhibition if he has fulfilled the conditions for them given above. The special papers set for C will, in this case, be regarded as papers both for B and A.

The subjects for examination are as follows:—

English (including History).
Mathematics.
Latin.
Greek.
French.
German.

In the examination a candidate will be permitted to offer any of the above subjects or all of them, and will not be disqualified from gaining an Exhibition by failure in, or omission of, any subject or subjects.

Twenty-five per cent. of the possible maximum in each subject offered will be deducted from the marks obtained by each candidate, and the remainder will be the marks assigned this work.

In the awarding of Exhibitions, marked excellence in any subject will be taken into special account.

Following are the details of the requirements in the above subjects:—

English and History.

1903 and 1904. *Language.*—Toller, Outlines of the History of the English Language (Macmillan & Co.).

Literature.—Coleridge, Ancient Mariner, ed. Bates (Longmans); Wordsworth, Selections, ed. Webb (Macmillan & Co.); Tennyson, Selections ed. Rowe and Webb (Macmillan & Co.; Shakspere, Merchant of Venice, ed. Deighton (Macmillan & Co.); As You Like It, ed. Deighton (Macmillan & Co.); Julius Cæsar, ed. Deighton (Macmillan & Co.).

History.—Green's Short History of the English People.

Composition.—An essay on some subject connected with the works specified.

Mathematics.

Geometry.—Euclid's Elements, Books I, II, III, IV, VI, with definitions of Book V and deductions.

A special paper will be set in deductions from the first three books. Candidates are recommended to study the Theorems and Examples in these books in Hall & Stevens' Edition.

Algebra.—Elementary Rules, Involution, Evolution, Fractions, Indices, Surds, Simple and Quadratic Equations of one or more unknown quantities, the three Progressions, Ratio, Proportion, Variation, Permutations and Combinations, Binomial Theorem, Logarithms, Interest and Annuities, as in Hall & Knight's Elementary Algebra, omitting Chapters 36, 40, 41 and 42.

Trigonometry.—Measurement of Angles, Trigonometrical ratios or functions of one angle, two angles, and of a multiple angle, as in Hamblin Smith, pp. 1-105, or as in Lock's Ele-

mentary Trigonometry, chapters I-XII, or in similar text-books.

In addition, the Solution of Triangles will be required.

Latin.

Higher Grammar, Higher Prose Composition, and Translation at Sight. Passages for translation from the following books:—

1903, 1904 and 1905.—Virgil, Aeneid I-VI; Caesar, De Bello Gallico; Cicero, Catiline Orations.

Greek.

Higher Grammar, Higher Prose Composition, and Translation at Sight. Passages for translation from the following books:—

1903, 1904 and 1905.—Homer, Odyssey VI-XII; Xenophon, Anabasis; Euripides, Hecuba and Alcestis.

French.

Higher Grammar, Higher Prose Composition, and Translation at Sight. Passages for translation from the texts prescribed for the B Exhibitions, and from the following, in addition:—

1903 and 1904. Thierry, Récits des Temps Merovingiens (Pitt Press); Mme. de Stäel, Le Directoire (Pitt Press).

German.

Higher Grammar, Higher Prose Composition, and Translation at Sight. Passages for translation from the texts prescribed for the A and B Exhibitions, and from the following in addition:—

1903 and 1904. Lessing, Minna von Barnholm.

SECOND YEAR EXHIBITIONS.

Seoond Year Exhibitions.

The examinations for Second Year Exhibitions and Third Year Scholarships will be held as usual in September. For time table, see p. 133. The following are offered for competition in 1903:—

Two of $125, open to both colleges.
One of 75, " " " "
One of 100, " to R. V. C. only.
One of 75, " to R. V. C. only.

The subjects of examination and details of the requirements in each are as follows:—

Greek.

Lucian, Charon and Somnium (Heitland, Pitt Press); Demosthenes, Olynthiacs I and II; Euripides, Medea.

Latin.

Cicero, Selections, Parts I. and II. (Brackenbury, Rivingtons); Cicero, De Senectute (Howson, Longmans); Horace, Odes, Bk. IV.

Greek and Latin Prose Composition, and Translation at sight.

A paper on Grammar and History.

Text-books.—Oman's History of Greece, chaps. I-XXV (to the outbreak of the Peloponnesian War); and How and Leigh's History of Rome, chaps. XVII-XLIV (from the first Punic War to the death of Sulla); Abbott's Arnold's Greek Prose Composition, *or* Sidgwick's First Greek Writer; Ramsay's Latin Prose, Vol. I or similar manual.

Mathematics.

Euclid (six books); Casey's sequel to Euclid; Algebra (Hall and Knight's Advanced); Theory of Equations (in part); Trigonometry (as in ordinary course of First Year).

English and Modern History.

Language.—Trench, Study of Words. *Literature.*—Spenser, Faerie Queene, Bk. 1, ed. Percival (Macmillan); Tennyson, Selections from Tennyson, ed. Rowe and Webb (Macmillan). *History.*—Church, The Beginning of the Middle Ages (Epochs of Modern History, Longmans). *Composition.*—The candidate will be required to write an essay on some subject connected with the literature or history prescribed.

French.

(*a*) Grammar; (*b*) Translation at sight of an English passage into French; (*c*) French composition on a prescribed subject; (*d*) a critical study of the following texts, tested by questions in the French language, to be answered in French:—

Balzac, Eugénie Grandet; Michelet, Pages choisies (chez A. Colin, Paris); Daudet, Jack.

Or, instead of French:—

German.

(*a*) Grammar; (*b*) Translation at sight from German into English, and from English into German; (*c*) a critical study of Die Braut von Messina, and of the lives of Schiller and Goethe; (*d*) Translation from the following texts:—

Schiller, Die Braut von Messina, der Neffe als Onkel; Hauff, Der Zwerg Nase (Heath & Co.); Riehl, Der Fluch der Schönheit (Heath & Co.); Benedix, Die Hochzeitsreise (Heath & Co.); Schiller, Der Neffe als Onkel; Baumbach, Die Nonna (Heath & Co.).

No Candidate who has been placed in the Third Class in more than one subject can be awarded a Second Year Exhibition.

THIRD YEAR SCHOLARSHIPS.

Third Year Scholarships.

The following Scholarships will be open for competition in September, 1903. (For time table, see p. 133):—

One of $125 for Mathematics and Logic, open to both colleges.

One of $125 for Mathematics and Logic, open to R. V. C. only.

One of $125 for Natural Science (Biology) and Logic, open to both colleges.

Three in Classics and Modern Languages, viz., one of $100 and two of $90; open to both colleges.

One of $125 in Economics and Political Science, open to both colleges.

The details of the requirements in each subject are as follows:—

Mathematics.

Mathematics and Logic, and Science and Logic.

Differential Calculus (Williamson, Chaps. 1, 2, 3, 4, 7, 9; Chap. 12, Arts. 168-183 inclusive; Chap. 17, Arts. 225-242 inclusive). Integral Calculus (Williamson, Chaps. 1, 2, 3, 4, 5; Chap. 7, Arts. 126-140 inclusive; Chap. 8, Arts. 150-156 inclusive; Chap. 9, Arts. 168-176 inclusive. Analytic Geometry (Salmon), Conic Sections, subjects of chaps. 1-13 (omitting Chap. 8), with part of Chap. 14. Lock, Higher Trigonometry. McLelland and Preston, Spherical Trigonometry, Part

I. Salmon, Modern Higher Algebra (first four chapters). Todhunter *or* Burnside and Panton, Theory of Equations (selected course).

Logic.

As in Jevons' Elementary Lessons in Logic.

Biology.

Goebel's Organography, Vol. I.; Bower, F. O., The Origin of the Sporophyte in Ferns, (Trans. Royal Soc.); Huxley, Elementary Lessons in Physiology; Verworn, General Physiology.

Greek.

Classics and Modern Languages

Plato, Purves, Selections, pp. 1-21, 55-112 (Clarendon Press); Thucydides, Book VI (Marchant, Macmillan); Sophocles, Antigone (Jebb, Pitt Press).

Prose Composition and Translation at Sight.

Latin.

Horace, Epistles, Book I (Wilkins, Macmillan); Cicero, Selections from Letters (Tyrrell, Macmillan), pp. 1-83; Virgil, Aeneid, Book IX (Sidgwick, Pitt Press); Sallust, Catiline (Cook, Macmillan).

Prose Composition and Translation at Sight.

Ancient History.

Text-books.—Bury, History of Greece, The Peloponnesian War (Macmillan); How and Leigh, History of Rome to the Death of Caesar (Longmans).

English and History.

Literature.—Shakspere, Tempest, ed. Deighton (Macmillan); Milton, Paradise Lost, Books I and II, ed. Macmillan (Macmillan); Lamb, Essays of Elia, ed. Hallward and Hill (Macmillan. *History.*—Myers, Mediaeval and Modern History (Ginn), Part I; For 1904.—Robinson, Introduction to the History of Western Europe (Ginn & Co.), Part I. *Composition.*—The candidate will be required to write an essay on some subject connected with the literature or history prescribed. High marks will be given for this subject.

French.

Candidates will be questioned on the subject matter of the following texts, the lives of their authors, and the literary schools which they represent. The entire examination will be held in the French language.

For 1903-4.—Molière, Tartuffe; Racine, Iphigénie; De Vigny, Servitude et Grandeur militaires; De Musset, Les Nuits, Pierre et Camille.

Or, instead of French:—

German.

(*a*) Grammar; (*b*) Translation at sight from English into German; (*c*) Critical study of the lives of Goethe and Schiller and of those of their works which are mentioned below; (d) Translations from the following texts:—

For 1903, Schiller, Don Carlos; Goethe, Dichtung and Wahrheit (Heath & Co.); Immermann, Der Oberhof (Wagner, Pitt Press); Meyer, Gustav Adolf's Page (Heath & Co.).

Economics and Political Science.

The subjects of examination are as follows:—

Economics and Political Science.

Elements of Political Science.—Seeley, Introduction to Political Science; Woodrow Wilson, The State, Chaps. I, V, XII to XVI, inclusive.

The Constitution and Government of England.—Macy, The English Constitution, Part I; Burgess, Political Science and Constitutional Law, Vol. II, pp. 59-76, 185-215, and 338-346 (Edition of 1898).

Elements of Economic Theory, viz.: The Scope and Method of Political Economy; the Organization of Production; the Theory of Value; Distribution—rent, wages, interest, profits; Exchange, including international trade; the Theory of Money; Principles of Taxation. F. A. Walker, Political Economy, Advanced Course.

History of Economic Theory.—L. L. Price, Political Economy in England.

[Two papers in Economic Theory; one in each of the other subjects. The subject-matter of the papers to be limited to what is treated in the books (or parts thereof) named.]

IV. REGULATIONS FOR DEGREES IN ARTS.

Regulations for the Degree of B.A.

After passing the First Year Matriculation Examination, an Undergraduate, in order to obtain the Degree of B.A. or B.Sc., is required to attend regularly the appointed courses of lectures for four years, and to pass the required Examinations in each year. He cannot take more than the number of subjects specified for each year without the special permission of the Faculty, nor can he proceed with his course unless he passes each examination in its assigned order. Failure in the First or Second Year in two or more subjects, and in the Third Year in more than one, will entail the passing at the beginning of the following session, of a Supplemental Examination, which shall include *all* the subjects of the previous Sessional Examination. Failure in *one* subject at this Supplemental shall necessarily cause the loss of the session. Undergraduates are arranged in Years, from First to Fourth, according to their academic standing.

1. Ordinary Course for the Degree of B.A.

N.B.—The Arabic numerals refer to the numbering of the courses on pp. 76, et seqq; for example, Greek, 2, refers to the second course given under the head of Classical Literature and History, p. 77.

First Year.

First Year.

Greek, 1, *or* **Latin, 1.**
English, 1A, 1B, and **History, 1.**
Mathematics, 1.
Latin, 1, *or* **Greek, 1,** *or* **French, I, 2,** *or* **German, 2.**
Physics, 2.

French cannot be taken as a qualifying option in the First Year, except by students who have passed the Matriculation Examination in this subject.

An additional Language may be taken as an extra subject in the first two years, if application be made to, and permission obtained from the Faculty at the beginning of the Session. Credit will be given for it on application.

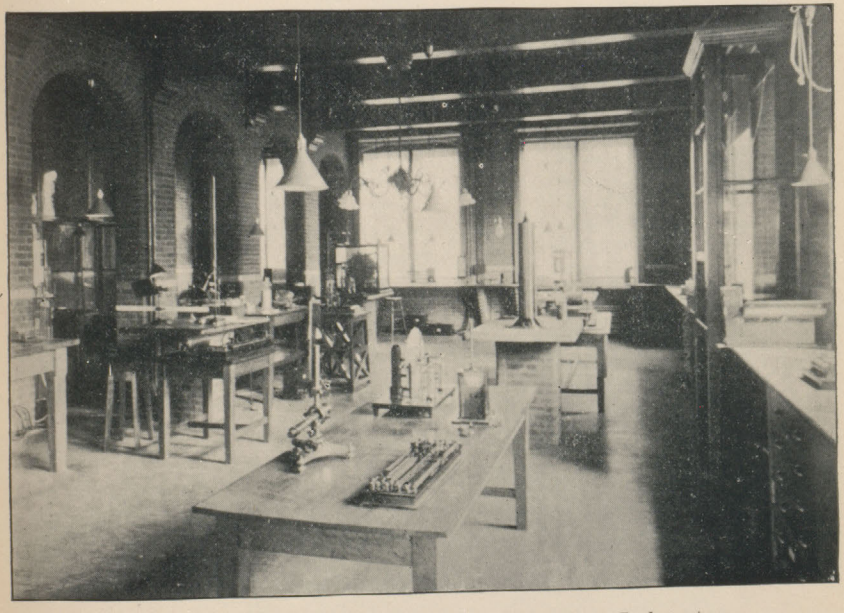
Advanced Sections.

With a view to the encouragement of higher work, Advanced Sections will be formed in all subjects as far as practicable, and in these Honours may be awarded. Permission to take an advanced section is granted by the professor.

Students taking the work of advanced sections may be excused from the work of the corresponding ordinary sections on the



Macdonald Physics Building.—Departmental Library.



Macdonald Physics Building.—An Electrical Laboratory.

recommendation of the professor. No exemptions from other subjects will be granted to students in advanced sections.

Second Year.

Second Year.

Any Three, of which (d), (e), or (g) must be one.

(a) English, 2.
(b) Latin, 2, *or* Greek, 2.
(c) Greek, 2, *or* Latin, 2, *or* a Modern Language.
(d) Mathematics, 3A, including Dynamics, 3B, *or* Elementary Biology, 1.
(e) Chemistry, 1, Laboratory work in addition.
(f) Logic and Psychology, 1A, 1B.
(g) Hebrew, I.
(h) German *or* French.

Students intending to take the double course in Arts (B.A.) and Applied Science must take Mathematics and Chemistry; those intending to take the double course in Arts (B.A.) and Medicine must take Chemistry and Biology.

Advanced Sections will be formed in the Second Year, as in the First.

Advanced Sections.

Third and Fourth Years.

Third and Fourth Years.

The subjects of the Third and Fourth Years are arranged in the following divisions:—

Language and Literature.	History, Philosophy and Law.	Science.
English, 3A, 3C, 4A, 4B, any two; or for any two, 3C.	History, 2.	Mathematics 4.
Latin, 3, 4.	Logic and Metaphysics, 3A, 3B.	Mechanics, 6, and Optics, and Astronomy, 5A, 5B. (Two half courses).
Greek, 3, 4.	Moral Philosophy, 5A, 5B.	Physics: Sound, Light, Heat (full course), 7A, 7B, 7C.
Sanskrit, 1A, 1B.	*Political Science, 6	Electricity and Magnetism (full course), 8.
Frenoh, 5, 6	*Economics, I.	Chemistry, 2, 3, 4; 5, 6, *or* 7, 8.
German, 4, 5.	Roman Law, I.	Zoology, 2.
Italian in alternate years.	Constitutional Law and History.	Botany, 2, 3.
Semitic Languages, 2, 3.	Art (History of) and Archæology (two half courses in successive years.	Geology, I.
Comparative Philology (half course), 1A, 1B.	History of Philosophy, 4A, 4B.	Physiology, Anatomy — *In the Faculty of Medicine.*

From the above divisions six courses are to be selected by each student in the Third and Fourth Years, three in each year.

*Political Science and Economics may be considered as continuations, one of the other.

Each will be studied in lecture courses extending over not more than four hours per week, with collateral reading, and, in the case of the science subjects, laboratory work. One subject chosen in the Third Year *must* be continued by every student in his Fourth Year (Political Science, 6, will be accepted as a continuation of Economics, 1, and *vice versa*); two subjects *may* be continued if application to that effect be granted by the Faculty or the Advisory Committee of the Faculty. Of the whole six courses, one must be chosen by all candidates from the list of subjects included under the head of Science, except in cases where Chemistry or Biology has been selected as an option in the Second Year.

Every undergraduate in the Third and Fourth Years is required to submit to the Faculty, for their approval, at the beginning of the session, a written statement of the subjects he proposes to study during the session. He will not be allowed to discontinue any of these, if approved, or begin any other, without the special permission of the Faculty.

The Advisory Committee will meet not later than Oct. 1st in each session, and report on the selections of subjects to the Faculty. It may also report on the subjects chosen by the First and Second Years.

In order to differentiate the B.A. curriculum from that laid down for the B.Sc. (Arts), candidates for B.A. are debarred from selecting more than three out of their six courses from the Science Division. Free options are allowed in all other cases (except as far as regards the selecting of at least one subject from the Science Division), subject to approval by the Faculty, or the Advisory Committee of the Faculty.

In addition to the six courses, a course of one hour a week in English Composition (3**D**, 4**C**) must be taken by every candidate for the Ordinary B.A. in the Third and Fourth Years, and also by Honour students in English.

For details of each subject, see Courses of Lectures, pp. 76, *et seqq.*

(Political Science, 6, will be accepted as a continuation of Economics, 1, and *vice versa*).

A candidate who seeks to obtain an Ordinary B.A. Degree of the First Class must fulfil the following conditions: he must not only obtain the required aggregate of marks (viz., three-fourths of the maximum), but he must also obtain First Class

standing in three of his subjects, and not less than Second Class in the remainder.

Professional Students.

For arrangements enabling Students in Medicine or Applied Science to take the course in Arts also, and obtain B.A., and B.Sc. (Applied Science), or M.D., in six years, see pp. 68–70; and for the course leading to the degrees of B.Sc. (Arts) and M.D. in six years, see pp. 70 and 71.

2. Honour Courses for the Degree of B.A.

Honour Courses.

Honours of First, Second, or Third Rank will be awarded to successful candidates in any Honour Course established by the Faculty, provided they have passed creditably the ordinary Examinations in all the subjects proper to their year.

No undergraduate is permitted to attend the Honour lectures unless (*a*) he has been placed in the First Class in the subject at the preceding Sessional Examination, if there be one; (*b*) has satisfied the Professor that he is otherwise qualified; and (*c*) while attending lectures makes progress satisfactory to the Professor. In case his progress is not satisfactory he may be notified by the Faculty to discontinue attendance.

Candidates for Honours must take the Ordinary Course in the subject in which they are reading for Honours. But where the Honours Course corresponds to two ordinary subjects, candidates may, at the discretion of the department, be exempted from attendance on lectures in these ordinary subjects for a number of hours not exceeding four weekly.

Honour lectures are open to all Partial Students who can satisfy the Professor of their fitness to proceed with the work of the course. Such students will not be ranked with undergraduates in the Examination lists.

No student is allowed to attend two Honour Courses without the special permission of the Faculty.

Third Year and B.A. Honours.

A student proposing to read for an Honour Course in the Third Year must

(1) Satisfy the Department of his qualifications to proceed with the subject or subjects in question;

(2) Fulfil the following qualifying conditions:—

(*a*) Where the Honour Course is represented by one subject in the Second Year, he must have obtained at least a Second Class in that subject and in one other.

Should he have failed in any subject, he must compensate for this by having obtained a First in the Honour subject.

(*b*) Where the Honour Course is represented by two subjects in the Second Year, he must have obtained at least (*a*) a Second Class in both subjects, or (*b*) a First Class in one subject and a Third in the other. A failure in some other subject may be compensated for by obtaining at least a First Class in one subject and a Second in the other.

(*c*) Where the Honour Course is not represented by any subject in the Second Year, he must have obtained at least Second Class in three subjects. A First and a Third may be considered equivalent to two Seconds. A failure may be compensated for by obtaining at least four Seconds or their equivalent.

(3) While attending lectures he must make progress satisfactory to the Department.

A student who desires to be a candidate for B.A. Honours must have taken at least Second Rank Honours in the Third Year. In this case he shall be required to take only one subject in his Ordinary Course, viz., that in which he is reading for Honours.

Note.—For subjects of Ordinary Courses, see p. 76, *et seqq.*

The following are the departments in which Honour Courses are at present offered. Students who desire to graduate with Honours in any of them are strongly recommended to take the Advanced Sections of the Department in the First and Second Years, where such are provided.

(N.B.—The numbers which stand after the Academic years refer to the corresponding numbers of the Courses given on the pages indicated.

I. Classical Literature and History.

Third Year Honours—Greek, 5, 6, (p. 79).
Latin, 5, 6, (p. 82).
Fourth Year Honours—Greek, 5, 7, (p. 79).
Latin, 5, 7, (p. 82).

2. English Language and Literature

Third Year Honours—5, 6, (p. 89).
Fourth Year Honours—7, 8, 9, (p. 89); or 10, 11, 12, 13, (p. 90).

3 (a) History.

Fourth Year Honours—4, 6, 9, (p. 98).

3 (b) History and Economics.

(A). Third Year Honours—History, 2, 4, 9, (p. 98).
Economics and Political Science, 1, 6, (pp. 100 and 102).
Fourth Year Honours—History, 4, 6, 9, (p. 98).
Economics and Political Science, 2, 3, and 7 or 8, (p. 100).
(B). Third Year Honours—Economics and Political Science, 1, 4, 5, 6, (pp. 100–102).
History, 2, (p. 98).
Fourth Year Honours.—Economics and Political Science, 2, 3, 4, 5, 7, 8, (pp. 100–102).
History, 4, 9, (p. 98).

4. Modern Languages.

Third Year Honours—French, 7 or 8; 9, (p. 93).
German, 6 or 7; 8, (p. 96).
Fourth Year Honours—French, 7 or 8; 9, (p. 93).
German, 6 or 7; 8, (p. 96).

5. Semitic Languages.

Third Year Honours—4*a* and 4*b*, (p. 97).
Fourth Year Honours—5*a* and 5*b*, (p. 97).

6. Mental and Moral Philosophy.

Third Year Honours—6, 7, 8, 9, (p. 106).
Fourth Year Honours—10, 11, 12, (p. 107).

7. Mathematics and Natural Philosophy.

Third Year Honours—7, 11, 12, 15, (p. 111).
Fourth Year Honours—8, 13, 14, 16, (p. 111).

8. Geology and Mineralogy.

Third Year Honours—Mineralogy, 1, 3, (p. 115).
Fourth Year Honours—Mineralogy, 2, (p. 116).
Fourth Year Honours—Geology, 2, 3A, 3B, 4, 5, 6, 7 (p. 122).

9. Chemistry.

Third Year Honours—2, 3, 4, (p. 114).
Fourth Year Honours—5, 6, 7, 8; or 7, 8, 9, (p. 114).

10. Biology.

Third Year Honours— { Botany, 5, (p. 119). Zoology, 4, (p. 121).
Fourth Year Honours— { Botany, 6, (p. 119). Zoology, 5, (p. 121).

Students proceeding to Honours Biology in the Third and Fourth Years will take Chemistry and Biology in the Second Year, one half course of Organic Chemistry in the Third Year, and one half course of Geology in the Fourth Year.

3. Ordinary Course for the Degree of B.Sc. (Arts.)

The B.Sc. course in Arts has been specially arranged to give the student a thorough training in Science, combined with a good knowledge of English, French, and German. A wide range of sciences may be studied, and the course differs from those offered in the Faculty of Applied Science in the substitution of modern languages for the more purely technical work of that Faculty.

A high standard of attainment will in all cases be exacted, and it is expected that in the Final Year the course will include instruction in the methods of modern research.

First Year.

English, 1A, 1B, and History, 1
French, 1, 2.
German, 2.
Mathematics, 1.
Physics, 2.

Second Year.

English, 2.
French, 3, 4.
German, 3.
Chemistry, 1—Laboratory work in addition.
Mathematics, 3A, 3B, *or* **Elementary Biology, 1.**

(*a*) Upon entering the Second Year, the student must decide upon the general character of the course which he will follow in the Third and Fourth Years. If his course in these Years is to consist chiefly of Mathematics and Physics, he must choose Mathematics; if it is to be chiefly Biological or Geological, he must take Biology; while if he intends to select Chemistry, he must take Mathematics if he intends to devote special attention to Physical Chemistry, but Biology if he intends to make special study of other branches of this science.

(*b*) A candidate for the degree of B.Sc. must obtain at least Second Class standing both in French and German at the Intermediate Examination, and, upon entering the Third Year, must, in order to proceed with his course, be able to read with ease scientific papers in both of these languages.

(*c*) The student shall in the Third Year take a full course in each of the three following sciences, viz.:—Mathematics, Physics, Chemistry, Zoology, Botany, Geology. He shall take, in addition, a portion of the B. A. Honour Course in one of them, as well as a course in English Composition.

(*d*) In the Fourth Year the student shall devote his time chiefly to advanced work in one of the three sciences which he has already studied in the Third Year. The course which he is to follow will be drawn up by the Professors of the science which he selects and must be approved by the B. Sc. Advisory Committee.

V. EXAMINATIONS.

(A) College Examinations.

1. There are two examinations in each year, viz., at Christmas and at the end of the Session. Successful students are arranged in three classes at the Sessional examinations.

Christmas Examinations will be held in all the subjects of the First and Second Years, and are obligatory on all undergraduates, and also on all Partial Students intending to gain

undergraduate standing. Twenty-five per cent. of the marks given for the sessional work in each subject will be assigned for the results of the Christmas Examinations. Students prevented by illness from attending the examinations, will, on presenting a Medical Certificate, be allowed full marks at the April examinations. Candidates who fail in courses of the First and Second Years, terminating at Christmas, will be required to pass, at the Sessional Examinations, on an extra paper in the subject in which they have failed.

Christmas Examinations in the Third or Fourth Years may be held at the option of the Professors. When held, the same value will be assigned to them as in the case of the First and Second Years.

In the Fourth Year only, there is no Sessional Examination; the University Examination for B.A. or B.Sc. takes its place.

2. An undergraduate who fails in one subject at the Sessional Examinations of the First or of the Second Year, will not be allowed to proceed with his Year unless he passes a Supplemental Examination therein at the beginning of the Session, or takes the Summer Course, if there be one, in the subject, and passes the corresponding examination.

3. Failure in two or more subjects at the Sessional Examinations of the First or of the Second Year, or in one subject at the Third Year Sessional Examinations, involves the loss of the Session. The Faculty may permit the student to recover his standing by passing a Supplemental Examination at the beginning of the following Session. If he fail in any subject at this examination he will be required to repeat the year.

A Summer Course, on same conditions as above, may be accepted instead of a Supplemental Examination.

4. Examinations Supplemental to the Sessional Examinations will be held in September, simultaneously with the Matriculation Examinations.

5. A list of those to whom the Faculty may grant Supplemental Examinations in the following September will be published after the Sessional Examination. The time for the Supplemental Examination will be fixed by the Faculty; the examination will not be granted at any other time, except by special permission of the Faculty, and on payment of a fee of $5.

(B) University Examinations.

For the Degree of B.A.

After passing the Matriculation Examination at entrance, candidates for the Degree of Bachelor of Arts must pass each of the four Sessional Examinations, including the Intermediate Examination at the end of the Second Year. Under the provisions of the new curriculum, the Third and Fourth Year Sessional Examinations constitute the Final.

1. Matriculation Examination.

1. The subjects are stated on p. 12.

2. Intermediate Examination.

2. The subjects are as follows:—

(a) **English.**
(b) **Greek** *or* **Latin.**
(c) **Latin** *or* **Greek** *or* **a Modern Language.**
(d) **Mathematics, including Dynamics,** *or* **Elementary Biology.**
(e) **Chemistry.**
(f) **Logic and Psychology.**
(g) **Hebrew.**
(h) **German** *or* **French.**

} **Any Three of which (d), (e), or (g), must be one.**

Students intending to take the double course in Arts (B.A.) and Applied Science must take Mathematics and Chemistry; those intending to take the double course in Arts (B.A.) and Medicine must take Biology and Chemistry.

English.—The course for the second year. See p. 86

Greek.—The course for the Second Year. See p. 77.

A paper will be set early in October on the Summer Readings, Lucian, Charon and Somnium (Heitland, Pitt Press). *See p. 77.*

Latin.—The course for the Second Year. See p. 81.

A paper will be set early in October on the Summer Readings, Cicero, Selections, Parts I and II, (Brackenbury, Rivingtons). *See p. 81.*

Mathematics.—The course for the Second Year. See p. 110.

Dynamics.—The course for the Second Year. See p. 110.

Elementary Biology.—The course for the Second Year. See p. 116.

Chemistry.—The course for the Second Year. See p. 113.

Logic and Psychology.—The course for the Second Year. See pp. 104 and 105.

Hebrew.—The course for the Second Year. See p. 97.

German.—The course for the Second Year. See p. 95.

French.—The course for the Second Year. See p. 92.

3. Final Examination.

The qualifying subjects for the B.A. Degree will, under the New Curriculum, consist of the six subjects taken up in course in the Third and Fourth Years (pp. 59–61).

VI. REGULATIONS FOR COURSES IN ARTS LEADING INTO THE PROFESSIONAL FACULTIES.

Arts and Applied Science.

1. Any student intending to claim the privileges offered below, is required, at the beginning of the session, to present to the Dean of the Faculty of Arts a certificate of registration in the Professional Faculty, and to produce at the end certificates of attendance and examination in the professional classes specified.

2. Undergraduates beginning the Third Year in Arts who have taken all the Ordinary Mathematics of the first two years, and the Chemistry of the Second Year, and who wish to pursue their professional studies in the Faculty of Applied Science so as to obtain the Degree of B.A. and B.Sc. (App. Sc.) within the following four years, will be exempted by the Faculty of Applied Science from the Mathematics of the First Year in Applied Science and from Chemistry of the Second Year.

3. They must, unless by special permission of the Faculty, distribute the course of the Third and Fourth Years in Arts

over three years, in accordance with the following schedule of studies:—

I. *In the Third Year*:—

(*a*) Physics of Third Year.

(*b*) Two of the courses which are not placed under the heading "Science" in the Arts curriculum. The time tables of the two Faculties allow two of the following subjects to be chosen:—English, History, Political Science.

(*c*) Either one or two hours weekly in English Composition.*

II. *In the Fourth Year*:—

(*a*) Physics of Fourth Year.

(*b*) One hour weekly in English Composition, if only one has been taken in the Third Year.

(*c*) The Mathematics of the Second Year Applied Science (6 hours weekly as 1½ courses).

III. *In the Fifth Year*:—

The Mathematics of the Third Year Applied Science (2 hours weekly as a half course), or another course in the Arts curriculum.

4. Students who, having obtained permission of the Faculty, desire to complete the course for the B.A. Degree in four years, are required to take a full course in one subject in the Arts curriculum in addition to the courses prescribed in 3, II, above.

Arts (B.A. Course) and Medicine.

1. Undergraduates beginning the Third Year, who have taken the Chemistry and Biology of the Second Year, and who wish to pursue their professional studies in the Faculty of Medicine so as to obtain the Degrees of B.A. and M.D. within the following four years, will be exempted by the Faculty of Medicine from the subjects of Chemistry and Physics, and Biology in the First Year of the Faculty of Medicine. In the Second Year (Arts) they are permitted to take the continuation course in Animal Biology, on the same conditions as students taking the six years' course leading to the degrees of B. Sc. and M.D.

*NOTE.—Students are recommended to distribute their English work over two years.

2. They may complete the Arts curriculum by taking the following courses:—

I. *In the Third Year*:—

(*a*) Anatomy and Practical Anatomy, Histology and Physiology, of First Year Medicine.

(*b*) Two of the courses which are not placed under the heading "Science" in the Arts curriculum. The time tables of the two Faculties allow the following to be chosen:—

(1) French or Moral Philosophy or Economics.

(2) Political Science.

(*c*) Either one or two hours weekly in English Composition.*

II. *In the Fourth Year*:—

(*a*) Anatomy and Practical Anatomy, Histology, Physiology, Chemistry, of Second Year Medicine.

(*b*) One hour weekly in English Composition, if only one has been taken in the Third Year.*

3. The Faculty strongly recommends intending students of Medicine who do not take the combined six years' course to spend a preliminary year in the study of the non-professional subjects, *i.e.*, Biology, Chemistry, and Physics, before entering on the curriculum in the Faculty of Medicine.

Arts (B.Sc. Course) and Medicine.

1. Students who wish to take a combined course in the Faculties of Arts and Medicine with a view to obtaining the Degrees of B.Sc. (Arts) and M.D. within six years, must take Latin under head 6 of the Matriculation requirements for the B.Sc. course, see p. 12.

2. They must take the Ordinary B.Sc. course with the following modifications:—

Second Year Students shall take Elementary Biology. This course shall consist of either (1) the course in Elementary Biology required of First Year Students in Medicine (*i.e.*, 8 weeks Zoology together with 4 weeks Botany), together with a further course after Christmas (during the spring term of the Faculty of Arts) in Animal Biology; or (2) the full ordinary

* Note.—Students are recommended to distribute their English work over two years.

course in Elementary Biology of the Faculty of Arts, consisting of 12 weeks Zoology (up to Christmas) followed by 12 weeks Botany.

Third Year Students taking the Double Course shall be required to offer one of the following:—

I. Zoology.—(*a*) The full Ordinary Continuation Course of the Faculty of Arts, and in addition (*b*) half the Honours Course, the latter to be taken during the first half of the session.

II. Physics.—(*a*) The Full Ordinary Course of the Faculty of Arts, under which head students may take either the course in Sound, Light and Heat (Physics, 7) or that on Electricity and Magnetism (Physics, 8), or a combined course consisting of portions of these, and in addition (*b*) advanced work constituting half an Honours Course, the latter to be taken during the first half of the session.

III. Chemistry.—(*a*) A half-course in Physical Chemistry, during the first half of the session (from Chemistry, 7, 8); (*b*) a half-course in Organic Chemistry, during the second half of the session (Chemistry, 3, 6); (*c*) advanced work constituting half an Honours Course, the last to be taken during the first half of the session.

IV. Botany.—(*a*) The full Ordinary Primary Course of the Faculty of Arts (Botany, 2); (*b*) *either* half the Honours Course prescribed for Fourth Year Students in the Faculty of Arts (Botany, 6); *or* half an Honours Course in Chemistry, Physics or Zoology. The work under (*b*) is in any case to be taken during the first half of the session.

Fourth Year.—Wednesday afternoon and Saturday morning of each week shall be devoted either (1) to Laboratory Work in connection with still more advanced study in the subjects selected during the Third Year; *or* (2) to work in another branch of Science, provided the student is sufficiently well grounded to enable him to do the special work which may be assigned to him.

Arts and Law.

Students intending to go forward to the Faculty of Law are recommended to include in their Third and Fourth Years Arts, such subjects as Constitutional Law and History, Economics, Political Science, and Roman Law.

Literate in Arts.

A certificate of "Literate in Arts" will be given along with the professional degree in Medicine or Applied Science, to those who have completed two years' study in the Faculty of Arts, and have passed the prescribed examinations.

Students of the University Attending Affiliated Theological Colleges.

1. These students are subject to the regulations of the Faculty of Arts in the same manner as other students.

2. The Faculty will make formal reports to the governing body of the Theological College which such students may attend as to:—(*a*) their conduct and attendance on the classes of the Faculty; and (*b*) their standing in the several examinations; such reports to be furnished after the Examinations, if called for.

3. Students of affiliated Theological Colleges who are pursuing a double course in Arts and Divinity (six years at least) will take in the Third and Fourth Years the courses which constitute the ordinary curriculum in Arts, less a half course in each of these Years, or a whole course in either.

VII. MEDALS, PRIZES, CLASSING, AND CERTIFICATES.

1. **Gold Medals** will be awarded in the B.A. Honour Examinations to students who take the highest honours of the First Rank in the subjects stated below, and who shall have passed creditably the Ordinary Examinations for the Degree of B.A., provided they have been recommended therefor to the Corporation by the Faculty on the report of the Examiners:—

The Henry Chapman Gold Medal for Classical Languages and Literature.

The Prince of Wales Gold Medal for Mental and Moral Philosophy.

The Anne Molson Gold Medal for Mathematics and Natural Philosophy.

The Shakspere Gold Medal for the English Language and Literature.

The Logan Gold Medal for Geology, Mineralogy and Palæontology.

The Major Hiram Mills Gold Medal for Biology.
The Governor-General's Gold Medal for Modern Languages and Literature (see below, paragraph 6).

In addition to the above, certain Medals are offered annually by the Alliance Française, at the discretion of the Department of Modern Languages.

If there be no candidate for any Medal, or if none of the candidates fulfil the required conditions, the Medal will be withheld, and the proceeds of its endowment for the year may be devoted to prizes in the subject for which it was intended. For details, see announcement of the several subjects below.

2. **Special Certificates** will be given to those candidates for B.A. who have been placed in the First Class at the ordinary B.A. Examination; have obtained three-fourths of the maximum marks in the aggregate of the six courses proper to the Third and Fourth Years, are in the First Class in not less than half of these courses, and have no Third Class. At this examination, no candidate who has taken exemptions (see pp. 68–72) can be placed in the First Class unless he has obtained First Class in four of the departments in which he has been examined, and has no Third Class.

3. **Certificates** of High General Standing will be granted to those Undergraduates of the first two years who have obtained three-fourths of the maximum marks in the aggregate of the studies proper to their year, are placed in the First Class in not less than half the subjects, and have not more than one Third Class.

4. **Prizes or Certificates** will be given to those Undergraduates who have distinguished themselves in the studies of a particular class, and have attended all the other classes proper to their year.

5. **Graduates** who attend lectures in any subject, and pass the corresponding examinations therein, may obtain certificates of their standing, whether the course in question be Ordinary, Advanced or Honour.

6. His Excellency the Earl of Minto has been pleased to offer annually during his term of office a Gold Medal for the study of Modern Languages and Literature.

Following are the regulations:—

(1) The subjects for competition shall be the French and German languages and literatures.

(2) The course of study shall extend over two years, viz., the Third and Fourth Years.

(3) The successful Candidate must be capable of speaking and writing both languages correctly.

(4) There shall be examinations in the subjects of the course in both the Third and Fourth Years, at which Honours may be awarded to deserving Candidates.

(5) The general conditions of competition and the privileges as regards exemptions shall be the same as for the other Gold Medals in the Faculty of Arts.

(6) Students from other Faculties shall be allowed to compete, provided they pass the examinations of the Third and Fourth Years in the above subjects.

(7) Candidates desiring to enter the Third Year of the Course, who have not obtained First-Class Standing at the Intermediate or Sessional Examinations of the Second Year in Arts, are required to pass an examination in the work of the first two years of the Course in Modern Languages, if called on to do so by the Professors.

(8) The subjects of examination shall be those of the Honour Course in Modern Languages.

7. The Neil Stewart Prize of $15 open to all Undergraduates and Graduates of this University, and also to Graduates of any other University, who are students of Theology in some College affiliated to this University. The rules which govern the award of this prize are as follows:—

(1) The Candidate must pass, in the First Class, a thorough examination upon the following subjects: Hebrew Grammar; reading and translation at sight from the Pentateuch, and from such poetic portions of the Scriptures as may be determined.

(2) There will be two Examinations of three hours each—one in Grammar and the other in Translation and Analysis

(Course for the present year: Hebrew Grammar (Gesenius; Translation and Analysis of Exodus; Isaiah XL. to the end of the book.)

(3) In case competitors should fail to attain the above standard, the prize will be withheld, and a prize of $30 will be offered in the following year for the same.

This Prize, founded by the late Rev. C. C. Stewart, M.A., and terminated by his death, was re-established by the liberality of the late Neil Stewart, Esq., of Vankleek Hill.

8. Early English Text Society's Prize.—This prize, the annual gift of the Early English Text Society, will be awarded for proficiency in the subjects of the language group in the English Honour curriculum of the Third and Fourth Years.

9. New Shakspere Society's Prize.—This prize, the annual gift of the New Shakspere Society, open to Graduates and Undergraduates, will be awarded for a critical knowledge of the following plays of Shakspere:—Hamlet, Macbeth, Othello, King Lear.

10. Charles G. Coster Memorial Prize.—This prize, intended as a tribute to the memory of the late Rev. Chas. G. Coster, M.A., Ph.D., Principal of the Grammar School, St. John, N.B., is offered by Colin H. Livingstone, B.A., to Undergraduates (men or women) from the Maritime Provinces (Nova Scotia, New Brunswick and Prince Edward Island). In April, 1904, it will be awarded to that Undergraduate of the First, Second or Third Year, from the above Provinces, who, in the opinion of the Faculty, has passed the most satisfactory Sessional Examinations, under certain conditions laid down by the donor.

11. Annie McIntosh Prize.—The income of the sum of $425, subscribed by the pupils and friends of the late Miss Annie M. McIntosh, will be offered as a prize to students of the Royal Victoria College in such subject or for such work as the Faculty may determine.

12. Science Scholarships Granted by Her Majesty's Commission for the Exhibition of 1851.—These scholarships of the value of £150 a year are tenable for two or, in rare instances, three years. They are limited, according to the Report of the Commision, "to those branches of Science (such as Physics, Mechanics and Chemistry) the extension of which is specially important for our national industries." Their object is not to facilitate ordinary collegiate studies, but "to enable students to continue the prosecution of science with the view of aiding in its advance or in its application to the industries of the country."

Seven nominations to these scholarships have already been placed by the Commissioners at the disposal of McGill University (in 1891, 1893, 1895, 1897, 1899, 1901 and 1903). A scholarship was awarded on each occasion.

When nominations are offered, they are open to students of not less than three years standing in the Faculty of Arts or of Applied Science, and are tenable at any University or at any other Institution approved by the Commission.

13. The names of those who have taken Honours, Certificates or Prizes will be published in order of merit, with mention, in the case of students of the First and Second Years, of the schools in which their preliminary education has been received.

VIII. SUMMER CLASSES.

During the months of May and June, a series of SUMMER CLASSES will be conducted, intended mainly in the first instance, to meet the requirements of students in the first two years of their course. The subjects offered are English, Latin, Greek, Mathematics, Logic, Physics, Chemistry, French and German. A fee of eight dollars will be exigible for any one class, and of four dollars for each additional class.

IX. COURSES OF LECTURES.

Classical Literature and History.

PROFESSORS:—W. PETERSON, M.A., LL.D.

ASSOCIATE PROFESSOR:—A. J. EATON, M.A., PH.D.

LECTURER :—S. B. SLACK, M.A.

TUTOR :— ————————

In this department, the work of the first two years is divided mainly between exercise in Grammar and Composition and the reading of selected authors. The attention of the student is at the same time directed to the collateral subjects of History, Literature, Antiquities, and Geography, in connection with which various text-books are recommended, as specified below.

In the Third and Fourth Years (as also in the Honour Courses) the instruction takes more of the lecture form, and an attempt is made to give a connected view of the leading branches of ancient literature, and the most important phases of ancient life and thought.

Students may be examined on the whole of the work prescribed for each class, even though it may not have been overtaken in lecture.

Subjects are suggested for Summer Readings in the various branches of class work. Students are strongly recommended to undertake these subjects during their long vacation, and credit will be given for them at an examination held in the first week in October.

Students are also recommended to devote some part of the vacation to the subjects set down under the head of History and Literature, which will form part of the Sessional Examination.



Macdonald Chemistry and Mining Building.

Greek.

Ordinary First Year.

1. In this class, besides a review of grammatical principles (Allen's Elementary Grammar), portions of some Greek authors—*e.g.*, Xenophon, Homer, Herodotus, Lucian, and Euripides—are read and explained.

For 1903-04, the work will be CebetisTabula (Jerram, Clarendon Press); Homer, Iliad XXII (Edwards, Pitt Press); Euripides, Alcestis (Blakeney, Bell & Sons). For *Composition*, the manual used will be North & Hillard's Greek Prose Composition (Rivingtons); for *Translation at Sight*, written and oral, Jerram's Reddenda Minora (Clarendon Press).

History.—From B.C. 560 to 479, Cox's "Greeks and Persians" (Longmans' Epoch Series).

Four hours a week.

Second Year.

2. The work of the Second Year will be selected mainly from the Greek Dramatists, and from Thucydides, Plato or Demosthenes.

Subjects for 1903-04:—

Summer Readings.—Lucian's Charon and Somnium (Heitland, Pitt Press). Students are also recommended to work through some portion of Burnet's Greek Rudiments (Longmans).

Sessional Lectures.—Thucydides, IV (Graves, Macmillan), in part; Homer, Odyssey IX (Edwards, Pitt Press); Sophocles, Electra (Jebb, Longmans, or Bayfield, Macmillan). The practice of *Composition and Translation at Sight* will be continued as before: North & Hillard's Greek Prose Composition (Rivingtons), and Jerram's Anglice Reddenda (First Series).

History.—The Athenian Supremacy; Cox's "Athenian Empire" (Longmans' Epoch Series), with Abbott's "Pericles" (Putnam).

Literature.—Outlines as contained in Jebb's Primer of Greek Literature, pp. 1-100.

Four hours a week.

The following books are recommended for general use during the first two years of the course:—Jebb's Introduction to Homer (Maclehose); Jebb's Primer of Greek Literature, supplemented by readings in Murray, Jevons or Mahaffy; Gow's Companion to School Classics (in part); Oman's History of Greece (Longmans), or Bury's (Macmillan); Mahaffy's Primer of Greek Antiquities; and Tozer's Primer of Classical Geography (Mac-

millan); Allen's Elementary Greek Grammar (Clarendon Press); or Burnet's Greek Rudiments.

Students should provide themselves also with Kiepert's Atlas Antiquus.

rd Year 3. Under the provisions of the new curriculum Greek is one of the subjects which may be offered as one of the six courses during the Third and Fourth Years together. The increased time which is thus given to it makes it possible to add to the reading of selected authors and the practice of Composition and Translation at Sight short courses of lectures on subjects of general interest in the departments of History, Philosophy, Literature, Art and Antiquities. One-fourth of the whole time of the Class (*i.e*, one hour a week) is devoted to such lecture courses.

For the Session 1903-04, the course will be as follows:—

a. Summer Readings.—Sophocles, Antigone (Jebb, Pitt Press, or Campbell & Abbott, Clarendon Press).

b. History, Literature, Art and Antiquities.—Courses will be delivered on two of the following three:—

(1) Greek Life and Antiquities—12 Lectures.
(2) An outline sketch of Greek Poetry—12 Lectures.
(3) Early Greece—12 Lectures.

These lectures will be illustrated, where possible, by lantern slides or photographs, while many of the best works on classical antiquities will also be accessible to the student in the College Library.

c. Authors.—Plato, Euthyphro (Heidel, American Book Company); Aristophanes, Knights (Merry, Clarendon Press); Isocrates, Panegyricus (Sandys, Rivingtons).

d. For practice in *Composition*, Sidgwick's Introduction to Greek Prose will be used; for *Translation at Sight*, Tod and Longworth, Passages for Unseen Translation (Longmans).

Four hours a week.

ourth ear. 4. Subjects for 1903-4.

Summer Readings.—Merriam's "The Phaeacians of Homer (Harper's), containing Odyssey VI, VII, VIII and XIII, 1-184.

The remainder of the course will be the same as for the Third Year.

The following books are recommended for general use: Gow's Companion to School Classics (Macmillan); Bury's History of Greece (Macmillan); Jebb's Growth and Influence of Classical Greek Poetry (Macmillan); Campbell's Guide to Greek Tragedy (Percival); Abbott's Pericles (Putnam); Haigh's The Attic Theatre (Clarendon Press); Cornish's Concise Dictionary of Greek and Roman Antiquities (Murray); Jevons' or Mahaffy's or Murray's History of Greek Literature; Kiepert's Manual of Ancient Geography (Macmillan); Greenidge's Constitutional History; King & Cookson's Comparative Grammar (Clarendon Press).

Students taking Comparative Philology as a half course in either the Third or Fourth Year may in that year omit from the prescribed courses in Greek, or Latin, or Greek and Latin together, one author and two of the short courses under the head of History, Literature, Art and Antiquities.

Honour
Third a
Fourth
Years

5. The work of the Honours Classes in Greek has been so arranged as to admit of separate courses of lectures being given, with illustrative readings, along certain main lines of literary study, in addition to supplementary work as provided for below. In 1903-04 the Lecture courses will be as under, the books selected for class reading being specified under each separate head:—

A. Alexandrine Poetry: Selections from Theocritus (Cholmley, Bell & Co.); Callimachus.

B. Drama: Aeschylus, Agamemnon (Sidgwick, Clarendon Press).

C. History: Thucydides VII (Marchant, Macmillan).

Three hours a week.

Translation at Sight.—Fox & Bromley's Models and Exercises (Clarendon Press).

Prose Composition.—Sidgwick, and from dictation.

Seminary Work.—Essays and Lectures on History, Literature, Comparative Philology and Ancient Philosophy.

Third Ye

6. *Private Reading.*—Plato, Purves's Selections, pp. 1-21, and 55 to 112 (Clarendon Press); Thucydides VI (Marchant, Macmillan); Sophocles, Antigone (Jebb, Pitt Press; or Campbell & Abbott, Clarendon Press).

In *History* the examination will be directed to testing a general knowledge of the course of Greek History to the death of

Alexander, and a more minute knowledge of the development of the Athenian Constitution and the period of Athenian Supremacy. In *Literature,* a general knowledge will be expected of the course of Greek literature and a more minute knowledge of the lives and writings of the authors prescribed.

Fourth Year.

7. *Private Reading.*—Sophocles, Trachiniae, (Jebb, Cambridge Press); Herodotus, Book VII (Butler, Macmillan); Aristophanes, Frogs (Merry, Clarendon Press); Attic Orators (Jebb's Selections, Macmillan); Aristotle, Ethics, I, II, and X (Bywater, Oxford); Theocritus, I, II, IV, XI, XV (Cholmeley, Bell & Sons).

History, Literature and Antiquities.—Oman, Bury, Symonds, Murray; Jebb's Growth and Influence of Classical Greek Poetry; Leaf's Companion to the Iliad; Butcher's Aspects of the Greek Genius; Mahaffy's Social Life in Greece; Jebb's Attic Orators.

Grammar and Philology.—Goodwin's Greek Moods and Tenses, and Giles's Short Manual of Philology (Macmillan); Monro's Homeric Grammar (Clarendon Press).

British School of Classical Studies in Athens.

This University is a contributor to the support of this School, which affords facilities for archæological and classical investigation, and study in Greece. Graduates in Arts of McGill University are accordingly entitled to special privileges and advantages as regards tuition in the School.

Latin.

rdinary. First Year.

1. In this class, besides a general review of grammatical principles (Latin Grammar, Gildersleeve and Lodge), portions of some Latin author,—such as Ovid, Tibullus, Livy, Sallust, Virgil, Horace or Cicero—are read and explained.

For 1903-4, the subjects will be Cicero, De Amicitia (Bennett, Sanborn & Co.); Ovid, Elegiac Selections (F. C. Smith, Bell & Co.); Virgil, Aeneid V (Phillipson, Bell & Co.). For practice in *Composition,* both written and oral, the text-book in use during the first year will be Nutting, Supplementary Latin Composition (Allyn and Bacon); and for *Translation at Sight,* Ritchie's Easy Passages for Sight Translation (Longmans). *History.*—Carthaginian Wars, B.C.,263-146; Shuckburgh's History of Rome, or "Rome and Carthage" (Longmans' Epoch Series).

Four hours a week.

Second Year.

2. For 1903-04, the subjects will be:—

SUMMER READINGS.—Cicero, Selections, (Parts I and II) (Brackenbury, Rivingtons).

Students are also recommended to continue the practice of Prose Composition (North and Hillard).

SESSIONAL LECTURES.—Livy ,Book XXI (Trayes, Bell & Sons); Horace, Church's Political and Historical Odes, (Blackie, Clarendon Press); Virgil, Aeneid VI (Sidgwick, Pitt Press). *Composition and Translation at Sight*, North and Hillard's Latin Prose Composition (Rivingtons); and Ritchie's Easy Passages (Longmans).

HISTORY.—The Last Century of the Republic, B.C., 133-31; as in Beesly's "The Gracchi, Marius and Sulla" (Longman's Epoch Series), and "The Roman Triumvirates" (Merivale, Longmans' Epoch Series).

LITERATURE.—The subject matter of Quintilian X, chap. 1, §§ 37-131.

Four hours a week.

The following books are recommended for general use during the first two years of the course: How and Leigh's History of Rome (Longmans); Strachan-Davidson's Cicero; Warde-Fowler's Caesar (Putnam); Literature; Wilkins' Primer of Roman Literature; Wilkins' Primer of Roman Antiquities; Latin Grammar, Gildersleeve and Lodge.

Students should provide themselves also with Kiepert's Atlas Antiquus.

Third Year.

3. Under the provisions of the new curriculum, Latin is one of the subjects which may be offered as one of six courses, during the Third and Fourth Years together. The increased time which is thus given to it makes it possible to add to the reading of selected authors and the practice of Composition and Translation at Sight short courses of lectures on subjects of general interest in the departments of History, Philosophy, Literature, Art and Antiquities. One-fourth of the whole time of the Class (*i.e.*, one hour a week) is devoted to such lecture-courses.

For the Session of 1903-04, the course will be as follows:—

a. SUMMER READINGS.—Virgil, Aeneid IX (Sidgwick, Pitt Press).

b. HISTORY, LITERATURE AND ANTIQUITIES.—Courses will be delivered on at least two of the following three subjects:—

(1) Private Life of the Romans—12 Lectures.
(2) The History of the Roman Empire—12 Lectures.
(3) History of Roman Literature from the end of the Republic—12 Lectures.

These lectures will be illustrated, where possible, with lantern slides or photographs, while many of the best works on classical antiquities will also be accessible to the student in the College Library.

c. AUTHORS.—Cicero, Pro Plancio (Auden, Macmillan); Tacitus, Histories II. (Godley, Macmillan); Catullus, Tibullus and Propertius (Wratislaw and Sutton, Bell & Sons).

d. For practice in *Composition*, Nixon's Parallel Extracts (Macmillan), and from dictation; and for *Translation at Sight*, Tod and Longworth, Passages for Unseen Translation (Longmans).

Four hours a week.

Fourth Year.

4. Subjects for 1903-04:—

SUMMER READINGS.—Horace, De Arte Poetica (Wilkins, Macmillan).

The remainder of the course will be the same as for the Third Year.

NOTE.—The following books are recommended for general use: Gow's Companion to School Classics (Macmillan); Mackail's Latin Literature (Murray); How and Leigh's History of Rome (Longmans); Pelham's Outlines of Roman History (Percival); Capes' Early Roman Empire (Longmans' Epoch Series); Cornish's Concise Dictionary of Greek and Roman Antiquities (Murray); Kiepert's Manual of Ancient Geography (Macmillan); Bennett's Appendix to Latin Grammar.

Students taking Comparative Philology as a half course in either the Third or Fourth Year may in that year omit from the prescribed courses in Latin, or Greek, or Latin and Greek together, one author and two of the short courses under the head of History, Literature, Art and Antiquities.

Honours. Third and Fourth Years.

5. As in Greek, the work of the Honours Classes in Latin has been so arranged as to admit of separate courses of lectures being given, with illustrative readings, along certain

main lines of literary study, in addition to supplementary work as provided for below. In 1903-04, the Lecture Courses will be on three of the following, the books selected for class reading being specified under each separate head:—

A. Epic Poetry: Virgil, Aeneid, I-IV (Sidgwick Pitt Press); Selections from Lucan and Statius.

B. Prose: Development of Latin Style (Gudeman's Prose Selections, Harper).

C. Satire: Merry's Fragments; Horace, Satires (Palmer); Juvenal (Duff, Pitt Press); Persius (Conington and Nettleship, Clarendon Press).

D. Oratory: Cicero, Verrine Orations (in part).

Three hours a week.

Translation at Sight.—Fox & Bromley's Models and Exercises (Clarendon Press). *Prose Composition.*—Selected passages.

Seminary Work.—Essays and Lectures on History, Literature, Comparative Philology and Ancient Philosophy.

6. *Private Reading.*—Horace, Epistles I (Wilkins, Macmillan); Cicero, Selections from Letters (Tyrrell, Macmillan, pp. 1-83); Virgil, Aeneid IX (Sidgwick, Pitt Press); Sallust, Catiline (Cook, Macmillan). **Third Year.**

History.—A general knowledge of Roman History to the end of the first Century A.D., and a more minute knowledge of the period from B.C. 146 to the Death of Augustus.

Literature.—A general knowledge will be expected of the course of Roman Literature, and a more minute knowledge of the lives and writings of the authors prescribed.

7. *Private Readings.*—Plautus, Trinummus, (Gray, Pitt Press); Livy II (Conway, Pitt Press); Cicero, Tusculan Disputations I, II, and Pro Cluentio (Peterson, Macmillan); Merry's Fragments of Early Latin Poetry (Clarendon Press); Quintilian, Book X (Peterson, Clarendon Press). **Fourth Year.**

History, Literature and Antiquities.—How & Leigh's History of Rome (Longmans); Tyrrell's Latin Poetry; Students' Companion to Latin Authors (Middleton & Mills, Macmillan).

Grammar and Philology.—Lindsay's Short Historical Latin Grammar (Clarendon Press) and Giles' Short Manual of Philology (Macmillan); Lindsay's Textual Emendation (Macmillan).

British School of Classical Studies at Rome.

The University has become a contributor to the support of this School, which has been recently instituted, and the same advantages will be enjoyed by members of the University as are offered in connection with the School at Athens (p. 80). The publications of both Societies are available in the University Library.

Sanskrit.

LECTURER: ————————

The two courses in Sanskrit are primarily intended for students who have passed the Intermediate examination, but permission may in certain other cases be obtained to attend the elementary course.

1. A. For beginners, the work mainly consisting in the mastering of the elements of Sanskrit Grammar with such composition as tends to fix in the mind the knowledge thus acquired. Etymological references will be frequently made and comparisons suggested in order at once to familiarize the language and give it an educational value in spite of the elementary nature of the course. This course counts as a half-course qualifying for the degree, and it is especially recommended to students attending the half-course in Comparative Philology.

Two hours a week.

1. B. For those students who have already passed through Course A or its equivalent in Sanskrit preparation; one hour per week is devoted to Lectures on Indian Literature, commencing (1903-04) with the Post Vedic Period. Two hours are devoted to reading selections; one hour to grammar and composition bearing especially on the texts read. Course B counts as one full course to the Final; courses A and B together, one and one-half, the student taking up Course B not being debarred thereby from repeating a course in another department.

Four hours a week.

Books required: Perry, Senskrit Primer; Whitney's Sanskrit Grammar; Lanman's Sanskrit Reader (Ginn & Co.). For reference: Sanskrit Literature, A. A. Macdonell (Heinemann).

Summer Readings.—A course of Summer Readings will be suggested according to individual needs. During the months of May and June the lecturer will be glad to give his personal supervision to students of Sanskrit and is prepared to give lectures if due notice is given.

Comparative Philology.

LECTURERS :— { A. JUDSON EATON, M.A., PH.D.
S. B. SLACK, M.A.

1. A.—INTRODUCTORY COURSE.—25 Lectures.

This course will deal with the following subjects: the history of the Science of Comparative Philology; the Indo-Germanic languages and their classification and relation to one another; the origin of the so-called Aryan people and their primitive home and culture; the nature of compounds; the phenomenon of Ablaut and its importance in explaining apparent irregularities of declension and conjugation; the existence of external Sandhi in the Indo-Germanic languages; and the influence of Analogy and Contamination in the formation of words. The lectures will then go on to consider the Phonology of the Indo-Germanic languages in detail.

1. B.—COMPARATIVE GRAMMAR OF GREEK AND LATIN.—25 Lectures.

This course will deal more exclusively with the history and structure of these languages and their relation to the other members of the group.

It is primarily intended for Honour Students in the Classics, but is open also to such others as may be found to be qualified.

Certain exemptions in the Classical Courses (see pp. 79 and 82) are allowed to students taking the lectures in Comparative Philology, enabling them to make a full course by combining it with either Greek or Latin, or two full courses by combining it with both.

English Language and Literature.

PROFESSOR :—CHAS. E. MOYSE, B.A.
ASSOCIATE PROFESSOR :—P. T. LAFLEUR, M.A.
LECTURER :—J. W. CUNLIFFE, D.LITT.
TUTOR AND LECTURER (ROYAL VICTORIA COLLEGE) :—
SUSAN E. CAMERON, M.A.

Ordinary. First Year.

1. A. ENGLISH LITERATURE.—The course will present an outline of English Literature from the Anglo-Saxon Period to the present day, and will be illustrated by printed syllabuses and lantern slides. The general subject will be divided into four periods (Pre-Chaucerian, Italian, French, Popular), and approached for the most part through literary types. Students are recommended to use Morley's Charts of English Literature. Three hours a week.

For affiliated Colleges in place of the above, the whole of Halleck's History of English Literature (American Book Co.).

1. B. ENGLISH COMPOSITION.—A course of lectures, chiefly synthetical, on the principles of English composition, with special reference to the use of words and the construction of sentences and paragraphs. Regular essays are required of all students. Text-Books:—Nichol's Manual (or an equivalent). One hour a week.

1. C. HISTORY.—The Main Epochs of European History, being History I. (see p. 98).

Second Year.

2. ENGLISH LITERATURE.—The course (for the Session 1903-04 only), will be 1. A of the First Year.

For affiliated Colleges, Halleck's History of English Literature, as above.

Fortnightly Essays will be required on subjects set in connection with the lectures and will be taken into account in determining the standing of students at the end of the session.

Third and Fourth Years.

3. A. ENGLISH LITERATURE.—Shakspere—This course will begin with a review of the early history of the English drama, and of the conditions which led to its development in the time of Elizabeth. The advances made by the earlier Elizabethan dramatists will be noted, and Shakspere's methods illustrated by a comparative study of A Midsummer Night's Dream, Romeo and Juliet, Henry V, As You Like It, Hamlet, Macbeth, King Lear, and The Tempest; the relation of these plays to their sources will also be considered. Students are recommended to read as many of Shakspere's plays as they can, and to give special attention to those mentioned above.

3. B. A course on Poetry and the Drama. England from 1660 to 1789, with special and detailed reference to changes in literary ideals and expression during the period discussed. The lectures will include poets, from Dryden to Crabbe; dramatists, from the writers of Heroic plays to Sheridan. Students will be called upon to pay special attention to the following works: Dryden, Absalom and Achitophel; Pope, Selections from the Essay on Man, and The Rape of the Lock; Thomson, The Seasons (one book); Cowper, The Task (one book); Crabbe, The Borough (four divisions); Dryden, Essay on Dramatic Poesy; Addison, Cato; Goldsmith, She Stoops to Conquer; Sheridan, The School for Scandal. Two hours a week.

3. C. English Language.—The course will consist mainly of the translation and examination of the English Language in its earliest and distinctive stages, and may be taken instead of any two courses in English Literature. From time to time the relation of English to other Teutonic languages will be illustrated. A few Early English texts will be studied with the view of elucidating the later history of English. There will be a series of illustrated lectures in which various details of literature and aspects of life in the period under investigation will be exhibited.

Text-Books:—Sweet, Anglo-Saxon Primer; Anglo-Saxon Reader (the whole). Morris, Specimens of Early English, Part II, Extt. I, II, VI, VII, IX. Four hours a week.

3. D. English Composition.—An advanced course on English Composition, including style, methods and principles of literary criticism treated from the historical point of view, and an introduction to the comparative study of literature in accordance with the most recent results of contemporary thought and research. In connection with this course students will be examined in a course of prescribed readings. Essays at stated periods are required of all.

Books of reference and authorities:—Saintsbury's History of Criticism; Lessing, Sainte-Beuve, Brunetière, Arnold, Ruskin, Worsfold. One hour a week.

4. A. English Literature.—A course on the Leading Poets of the Nineteenth Century. The chief aspects of the French Revolution will be considered, and Republican feeling in England illustrated chiefly from the works of Wordsworth, Coleridge and Southey. The indirect revolutionary poets Byron and Shelley will then be considered, and their typical poems, together with those of the poets already mentioned, critically examined. The remainder of the course will be given to Scott, Keats, Tennyson, Browning and Swinburne. Two hours a week.

The following poems have been selected for private reading. A paper will be set on them at the sessional examination of the Fourth Year:

Wordsworth:—The Scholars of the Village School of—; Two April Mornings; The Fountain; The Peak of Weatherlam, in the Prelude—("One Summer evening (led by her) I found," Book I); Lucy Poems; "Earth has not anything—;"

Hart-leap Well; Tables Turned; Lines written in early spring; To my Sister; Excursion—The Vision in the Skies, ("So was he lifted gently from the ground," Book II); The Child and the Shell, ("I have seen a curious Child," Book IV); Laodamia; "It is a beauteous evening"; "The world is too much with us"; "Scorn not the Sonnet"; "Milton, thou shouldst be living"; Daffodils; The Yarrow Poems. Coleridge:—Dejection; Ode to France; Lines to a Gentleman, composed on the Night after his Recitation of a Poem on the Growth of an Individual Mind; Love; Youth and Age; Fancy in Nubibus; Christabel; Hymn before sunrise in Vale of Chamouni. Scott:—Lady of the Lake; Wild Huntsman; Fire King. Byron:—A Distant View of Harrow on the Hill; Childish Recollections; Manfred; Childe Harold, Canto I. Keats:—Isabella; Ode to a Grecian Urn; Chapman's Homer. Shelley:—Ode to the West Wind; The Cloud; The Skylark; Alastor; Ozymandias; Adonais. Tennyson:—The Princess; In Memoriam. Browning:—Christmas Eve and Easter Day; Saul; Johannes Agricola; Pictor Ignotus; Fra Lippo Lippi; Andrea del Sarto; The Bishop orders his Tomb at Saint Praxed's Church; Bishop Blougram's Apology.

4. B. A general course on the history of English Prose Fiction from Richardson to the middle of the nineteenth century, treating of the various forms successively given to English novels during the period, and the influences that stimulated or otherwise affected such productions. While students are expected to show particular knowledge of English masterpieces in this kind, frequent reference to cognate works by continental writers will also demand some familiarity with contemporary European literature. Portions of the following works will be selected for detailed study and discussion: Richardson, Clarissa Harlowe; Fielding, Amelia; Goldsmith, The Vicar of Wakefield; Godwin, Caleb Williams; Walpole, The Castle of Otranto; Thackeray, Henry Esmond. *Books of reference*:—Raleigh, The English Novel; Dunlop, History of Fiction; Tuckerman, Jeaffreson. Two hours a week.

4. C. English Composition.—The statement respecting 3 D (p. 87), indicates the method and character of this course, which is regarded as a continuation of the course in the Third Year.

Honour students of the Third Year will take courses 5 and 6 in addition to the ordinary English requirements of the Third Year in language *and* literature. **Honours. Third Year.**

5. CHAUCER, SPENSER AND MILTON.—Chaucer will be considered with reference to the social life of his time, which will be illustrated from his works, chiefly from the Prologue to the Canterbury Tales. He will then be discussed with the view of bringing out not only his intrinsic merits, but his connection with French and Italian literature and his relation to his predecessors and successors in English poetry.

Students will read the following works for examination: Prologue to the Canterbury Tales; The Knightes Tale; The Parlement of Foules; The Hous of Fame.

Two hours a week up to Christmas.

After Christmas, Spenser and Milton will be studied, first in relation to the political and religious life of their times, and afterwards as to their poetic development and influence.

Students will read the following works for examination: Mother Hubbard's Tale; Colin Clout's Come Home Again; Epithalamium; Faerie Queene, Bk. 1; Milton's English Poems of the First Period (to 1637); Paradise Lost, Bks. I and II.

Two hours a week.

6. Prose writers before Dryden.—The main object of the course will be to discuss the chief literary influences visible in the Pre-Restoration writers of English Prose and to examine characteristics of style. The subject will be treated chronologically. As the course is largely interpretative and critical, facts of biography will be used only when they illustrate points of moment.

Students will read the following works for examination: More, Utopia; Sidney, An Apologie for Poetry (Cook); Lodge, Rosalynd (Collier's Shakespeare's Library); Bacon, New Atlantis; Earle, Microcosmographie (Arber); Milton, Areopagitica (Hales).

Two hours a week.

Honour Students of the Fourth Year will select Language *or* Literature. **Honours. Fourth Year.**

LANGUAGE.—The main subjects of study will be Anglo-Saxon, Middle English and Mœso-Gothic. Elementary courses may be given in Icelandic and Old Saxon if thought desirable.

7. Anglo-Saxon.—The whole of *Béowulf* will be read in class and illustrated by notes on origins, philology and textual emen-

dations. *Text-Book*: Harrison and Sharp's *Béowulf* (Ginn). Students will read selected portions of other poems for examination. Anglo-Saxon prose will be studied mainly in the translation of Gregory's Pastoral Care and Ælfric's Homilies. Students will be guided in the examination of dialectal texts and referred to important articles in periodical literature dealing with that subject and also with the field of Anglo-Saxon generally.

Three hours a week.

8. Middle English.—The course is intended to give a knowledge of dialectical English and to illustrate the changes the language has undergone. The texts given in Morris's Specimens of Early English, Part I, and Morris and Skeat's Specimens of Early English, Part II, may be regarded as the chief material for study. A list of books of reference and of important monographs will be given at the commencement of the course.

Two hours a week.

9. Mœso-Gothic.—The course on Mœso-Gothic is intended to open the way to the comparative study of allied Teutonic languages. Particular attention will be given to the phonological relations of Mœso-Gothic and Anglo-Saxon. *Text-Books*: Wright, Primer of the Gothic language; Ulfilas (Heyne).

Literature.—The courses in Literature deal mainly with the post-Restoration period. Two of them are of a general character and two are limited to individual authors. The latter may be supplemented by courses on Wordsworth and Tennyson.

10. Modern Prose Writers.—After a short sketch of the earlier history of English prose, attention will be directed to the development of periodical literature and the rise of journalism. The influence of leading essayists upon their contemporaries and successors will be analyzed, with special reference to the works of Carlyle, Ruskin, Matthew Arnold and Robert Louis Stevenson. Some account will be given of modern newspaper organization and its relation to present-day literature.

Students will read the following works for examination: Carlyle, Heroes and Hero Worship; Ruskin, Crown of Wild Olive; Arnold, Essays in Criticism, Second Series (Macmillan); Stevenson, Virginibus Puerisque.

Two hours a week.

11. Comparative Literature.—A course of lectures on the influence of English literature upon the continent of Europe, chiefly during the eighteenth and nineteenth centuries. The treatment discusses mainly the historical development of ideas, but examines also corresponding modifications regarding literary method and form.

Voltaire, Letters concerning the English Nation; Elton, The Augustan Age; Texte, Jean Jacques Rousseau and the Cosmopolitan Spirit in Literature (tr. Matthews); Brunetière, L'Evolution des Genres.

Two hours a week.

12. Shakspere.—The history of Shakesperean criticism, textual and æsthetic, will be traced from its beginnings in England and Germany to the present time. Students will be directed to make themselves acquainted by private reading with the most important problems and results of modern research.

Two hours a week before Christmas.

13. Browning.—This course will aim at explaining Browning's view of the poetic art, his characteristic methods, and his outlook on the life and thought of his time. Selected shorter poems will be studied in class, and detailed lists of these, arranged under subject-headings, will be supplied for private reading.

Two hours a week after Christmas.

Modern Languages.

Professor :—Hermann Walter, M.A., Ph.D.

Lecturers : Leigh R. Gregor, B.A., Ph.D.; E. T. Lambert, B.A.; J. L. Morin, M.A.

Tutor and Lecturer (Royal Victoria College) :—
Mlle. Milhau, Lic. Univ. Fr., Officier d'Academie.

A.—French.

Owing to the position which this University occupies in the midst of a very large French-speaking population, there is a permanent demand for courses of a practical, conversational character; for the same reason the Department profits by the co-operation of French church services, French family life, French newspapers, French theatres, French literary clubs, and public lecture courses in the French language.

In drawing up the following dual courses endeavours have been made to meet the special needs of the professional men of the Province of Quebec (every student being given the opportunity to learn to speak French), and also to provide for the maintenance of scientific methods. In Courses 1 and 3, the study of grammar and literature is carried on in accordance with the usual academic traditions, the French language being, however, largely used in class instruction. In Courses 2 and 4, the method of teaching is of a more practical character; the French language only is used, and the texts prescribed are made the subject of conversation, analysis, résumés, etc. In the Third and Fourth Years all lectures are given and all studies carried on in French.

Students will take as part of their Honour Course in Modern Languages that part of section 1. A, of the course on Comparative Philology (p. 85), which deals with the general principles of linguistic development.

Ordinary. First Year.

1. Borel, Grammaire Française (Holt and Co.). The following texts will be studied: G. Sand, La Mare au Diable (Ginn and Co.) Super, Histoire de France (Holt and Co).

2. Maupassant, Huit contes choisis (Heath and Co.); Lamartine, Scènes de la Révolution Française (Heath and Co.); Labiche, Voyage de M. Perrichon (American Book Co.); Mérimée, Quatre Contes (Holt and Co.); A number of French poems selected by the Department.

There will be regular written exercises. Great importance will be attached to correct pronunciation, which will be taught phonetically.

The examinations for the students of Affiliated Colleges will include the whole of courses 1 an 2. Equivalents for the oral work of Course 2 and the oral examination will be stated on application.

Four hours weekly, two for each course.

Second Year.

3. Summer Readings for students entering on their Second Year:—Molière, Femmes Savantes; Vigny, La canne de jonc (Heath and Co.).

Sessional Lectures.—Macmillan's Third French Course; Corneille, Horace (Holt and Co.); Hugo, Les Misérables (Ginn and Co.); Elementary Historical French Grammar.

4. Ségur, La Retraite de Moscou (Holt and Co.); Racine, Andromaque (Heath and Co.); Hugo, Ruy Blas (Heath and Co.); Mansion, Petite esquisse de la Littérature Française (McDougall, London).

The examination for the students of Affiliated Colleges will include the whole of Courses 3 and 4. Equivalents for the oral work of Course 4 and the oral examination will be stated on application.

Four hours weekly, two for each course.

Third and Fourth Years.

5. These courses will consist mainly in the study of French Literature and Advanced Prose Composition.

Summer Readings for students entering on the Third or Fourth Year:—Molière, Misanthrope (Holt and Co.); Renan, Souvenirs d'Enfance et de Jeunesse (Heath and Co.).

1903-1904.

Sessional Lectures.—Literature in the XVIIIth and XIXth Centuries; Lesage, Gil Blas (Heath and Co.); Marivaux, Le Jeu de l'Amour et du Hasard; J. J. Rousseau, Selections; Voltaire, Mérope; Victor Hugo, Hernani; Musset, Selections (Ginn and Co.); Balzac, Eugénie Grandet; Banville, Gringoire.

Prose Composition.—Spiers Graduated Course of Translation into French Prose (Simpkin, Marshall and Co., London.)

1904-1905.

6. Literature up to the end of theXVIIth Century; Corneille, Polyeucte; Racine, Athalie, Bajazet; Molière, L'Avare; Boileau, L'Art Poétique (Pitt Press); La Bruyère, Selections; Madame de la Fayette, La Princesse de Clève; Faguet, Littérature Française.

Prose Composition:—Spiers, Graduated Course of Translation into French Prose (Simpkin, Marshall and Co., London).

N. B.—In order to be admitted to the above classes a student must understand French well enough to take lectures delivered in French.

Four hours weekly.

Honours. Third and Fourth Years.

The work of the Honours Classes in French is divided into three sections. The First includes the Historical study of the French language, the Second, the History of French Literature, the Third, French Composition and the Reading and Study of French Texts. The First and Second Sections are taken up in alternate years, the Third annually. Students of the Third and Fourth Years take lectures together. In order to obtain Honours, candidates must be able to speak French fluently.

Philology. 1903-1904.

7. This course will deal with the Historical development of the French language from its origin to the present day. The Old French Period will receive special attention, and in this connection the oldest texts will be read. Provençal grammar will

necessarily be referred to. Students will make use of Schwan's Altfranzösische Grammatik (revised by Behrens), Darmesteter's Cours de Grammaire Historique and Nyrop's Grammaire Historique.

Three hours weekly.

History of Literature. 1904-1905

8. Inasmuch as the Ordinary Course provides a comprehensive survey of French Literature, Honour Students will be required to make a special study of certain men, movements and periods.

Three hours weekly.

Texts and Composition.

9. Students will receive instruction in the art of composition. They will be required to write a number of French papers on literary subjects, in connection with which readings will be suggested.

N. B.—Before entering on their Third Year Course, Honour Students are expected to have read the following: Corneille, Le Cid, Horace, Cinna, Polyeucte; Racine,—Andromaque, Britannicus, Phèdre, Athalie; Molière,—Ecole des Femmes, Misanthrope, Tartuffe, Le Bourgeois Gentilhomme, Les Femmes Savantes; Boileau,—L'Art Poétique, except where these texts are part of the readings prescribed for the Ordinary Course.

B.—German.

The Ordinary Courses mainly keep practical ends in view. In the first two years special attention is given to Grammar, in the Third and Fourth to Literature. Texts are studied from the æsthetic and critical as well as from the historical and linguistic point of view. A considerable amount of translation is done in class. English-German exercises in the prescribed text-book on Grammar being supplemented by the translation into German of easy prose passages and the retranslation of texts. Importance is attached to correct and expressive reading aloud.

Ordinary. Beginners Course.

1. The Joynes-Meissner German Grammar (Heath & Co.); Huss, German Reader (Heath & Co.); Wildenbruch, Stille Wasser (Heath & Co.); Stern, Geschichten vom Rhein (American Book Co.); Moser, Der Bibliothekar (American Book Co.).

Tutorial classes conducted during May and June enable students to overtake work not completed by the close of the Winter Session.

Four hours weekly.

2. The Joynes-Meissner German Grammar; Horning's German Composition; Wildenbruch, Das Edle Blut (Heath & Co.); Uhland, Ballads and Romances (Macmillan & Co.); Heyse, L, Arrabbiata (G. Wahr); Schiller, Maria Stuart (Heath & Co.). **First Year.**

Four hours weekly.

The examination for the students of Affiliated Colleges will, in addition to the above, include equivalents for the oral examination to be stated on application.

SUMMER READINGS for students entering on their Second Year:—Hauff, Lichtenstein (Heath & Co.).

3. SESSIONAL LECTURES.—The Joynes-Meissner German Grammar; Horning's German Composition; Schiller, Wilhelm Tell (Heath & Co.); Meyer, Gustav Adolf's Page (Heath & Co.); Goethe, Hermann and Dorothea; Schiller, Das Lied von der Glocke (Heath & Co.); Schiller's Ballads (Heath & Co.); Keller, Bilder aus der Deutschen Literatur (American Book Co.). **Second Year.**

Four hours weekly.

The examination for the students of Affiliated Colleges will, in addition to the above, include equivalents for the oral examination to be stated on application.

SUMMER READINGS for students entering on their Third or Fourth Year.—Freytag, Soll und Haben (Heath & Co.).

4. SESSIONAL LECTURES.—Lessing,, Emilia Galotti (Heath & Co.); Goethe, Iphigenie auf Tauris (Pitt Press); Schiller, Historische Skizzen (Clarendon Press); Keller, Dietegen (Ginn & Co.); Heine, Poems (Heath & Co.). **Third and Fourth Years. 1903-1904.**

5. Goethe, Egmont (Ginn & Co.); Schiller, Die Braut von Messina; Kleist, Prinz Friedrich von Homburg (Ginn & Co.); Sudermann, Der Katzensteg (Heath & Co.); Heine, Harzreise. **1904-1905.**

Translation of prose passages from English into German. Four hours weekly in each year.

The work of the Honour Classes in German is divided into three Sections. The First includes the Historical study of the German Language; the Second, the History of German Literature; the Third, German Composition and the Reading and Critical Study of Texts. The First and Second Sections are taken up in alternate years; the Third, annually. Students of the Third and Fourth Years take Lectures together. Language in German is taken up in the same Session as Literature **Honours. Third and Fourth Years.**

in French, and *vice versa*. The German Language alone is used in class instruction.

In order to obtain Honours, candidates must be capable of speaking German fluently.

Philology. 1904-1905. 6. (*a*) A general outline of the development of the German Language from its origin to the present day, in the course of which the operation of the principal laws exemplified in the growth of the language will be traced.

(*b*) A special study of the Middle High German period, its language and literature, with selected texts.

The following books will be used:—Bachmann, Mittelhochdeutsches Lesebuch (Faesi and Beer, Zurich); F. Kaufmann, Deutsche Grammatik; Behaghel, Die Deutsche Sprache; Wright, Middle High German Primer (Clarendon Press).

Three hours weekly.

History of Literature. 1903-1904. 7. Inasmuch as the Ordinary Course provides a comprehensive survey of German Literature, Honour Students will be required to make a special study of certain men, movements and periods.

Three hours weekly.

Texts and Composition. 8. Students will receive instruction in the art of composition. They will be required to write a number of German papers on literary subjects in connection with which readings will be suggested.

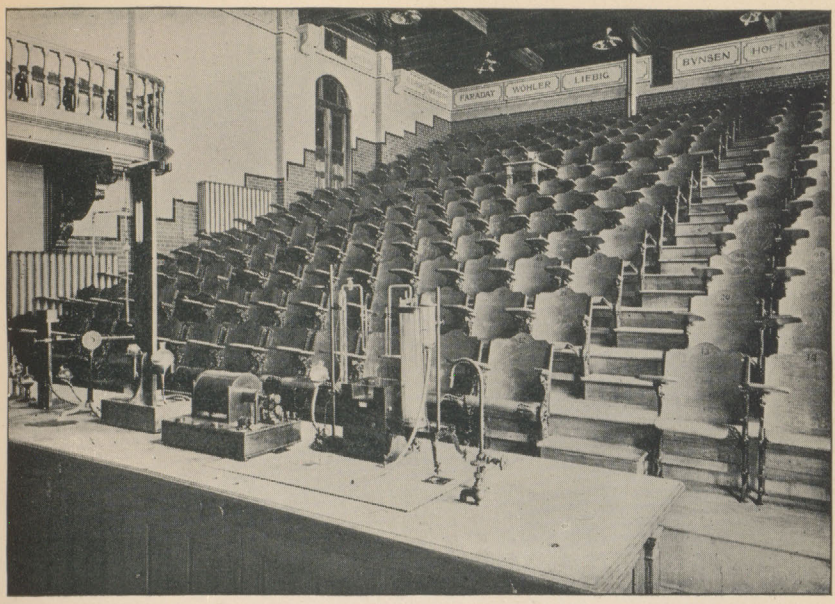
N.B.—Before entering on their Third Year Course, Honour Students are expected to have read the following:—Lessing,—Minna von Barnhelm or Nathan der Weise; Schiller,—Wilhelm Tell, Maria Stuart, Jungfrau von Orleans, Wallenstein, Ballads; Goethe,—Goetz von Berlichingen, Egmont, Hermann und Dorothea, Poems, except where these texts are part of the readings prescribed for the Ordinary Course.

Italian.

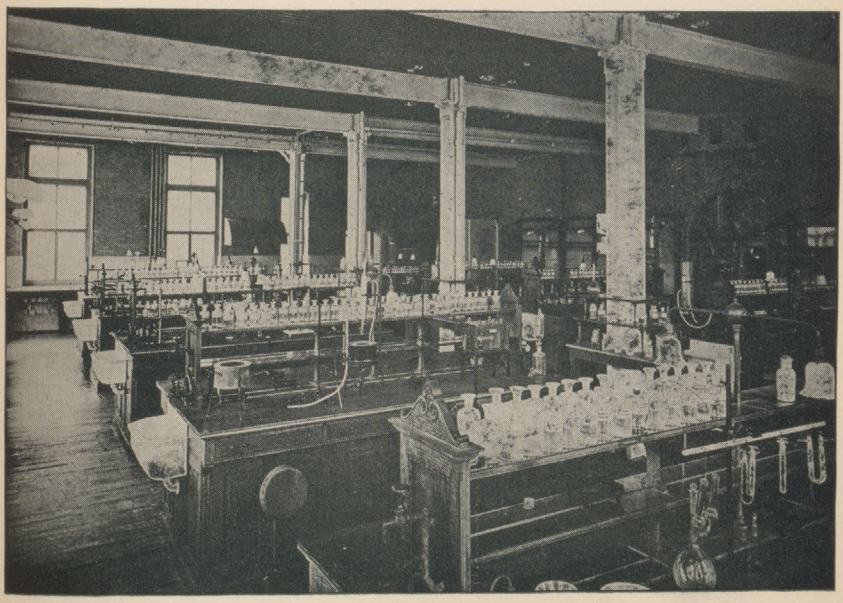
LECTURER:—LEIGH R. GREGOR, B.A., PH.D.

The following course, given in alternate years, is intended for students who have passed the Intermediate Examination. Partial students who wish to join the class must give satisfactory evidence of their ability to keep up with the undergraduates.

1903-1904. Grandgent, Italian Grammar (Heath & Co.); Grandgent, Italian Composition (Heath & Co.); De Amicis, Selections from Il Cuore; Manzoni, Selections from I Promessi Sposi; Mar-



Macdonald Chemistry Building.—A Lecture Theatre.



Macdonald Chemistry Building.—A Laboratory.

tuscelli, Raccolta di scelte poesie (Chiurazzi, Naples); selections from the Divina Commedia; Notes on some of the great names of Italian Literature.

Semitic Languages.

PROFESSOR :—D. COUSSIRAT, B.A., B.D., D.D., OFFICIER DE L'INSTRUCTION PUBLIQUE.

The course comprises lectures on the above languages and their literature, their genius and peculiarities Comparative philology, affinity of roots, etc., also receive due attention, while the portions selected for translation will be illustrated and explained by reference to Oriental manners, customs, history, etc.

1. Hebrew grammar and translation. English rendered into Hebrew. Masoretic notes explained. The Hebrew text compared with the Septuagint and Vulgate Versions. Four hours a week. **Ordinary Second Year.**

   This course may also be taken as a course in either the Third or Fourth Years, by students who have not taken it in the Second Year.

2. Hebrew Syntax. Translation of difficult passages of the Old Testament. Notes on the Massora and the Talmud (Mishna and Gemara). Aramaic. **Third Year**

3. Translation continued. Characteristics of the Semitic Languages, particularly of Aramaic, Syriac, Samaritan, Rabbinic, Arabic, Assyrian. Semitic Inscriptions. Four hours a week for the combined courses. **Fourth Year.**

4*a*. HEBREW.—Genesis, Isaiah, 40-66. Ecclesiastes. *Literature.*—F. Lenormant, The Beginnings of History. **Honours. Third and Fourth Years.**

HEBREW.—The course for the Second Year.

HEBREW.—The course for the Fourth Year.

4*b*. ARAMAIC.—Daniel. Ezra. Selections from the Targums. *Literature.*—Sayce, Lectures on the Origin and Growth of Religion. Two hours a week.

5*a*. HEBREW.—Malachi, Psalms, 1-72; Job, 26-42. *Literature.*—Renan. A general History of the Semitic Languages.

5*b*. SYRIAC.—Selections from the Peshito, and from the Chronicles of Bar Hebræus. *Literature.*—W. Wright, Comparative Grammar of the Semitic Languages.
Two hours a week.

History.

PROFESSOR :—CHARLES W. COLBY, M.A., PH.D.
LECTURER :—STEPHEN B. LEACOCK, B.A.

1. The Main Epochs of European History.

Ordinary. First Year. Twenty-four lectures will be given on as many subjects, taken from Ancient, Mediæval and Modern History. The design of the course is less to present a mass of facts than to illustrate the chief features of racial, political and social progress. A syllabus has been prepared which contains a list of topical readings. The sessional examination will be based mainly on these and on the following text-book:—"European History," by G. B. Adams (Macmillan). The results of the examination will be counted under the head of English. Students will be required to present short essays on historical subjects at regular intervals. A few illustrated lectures may also be given if suitable hours can be found. The use of Putzger's Historischer Schul-Atlas is recommended.

One hour a week.

Third or Fourth Year. 2. The Mediæval and Modern History of Europe, 378-1648 This is a general course dealing with the historical development of European nations from the German Inroads to the Peace of Westphalia. Special attention will be devoted to institutions and movements. Topics for investigation will be frequently assigned, and students will write at least one thesis during the year. Readings to accompany each lecture are assigned in the syllabus for the course.

Four hours a week.

Honours. Third and Fourth Years. 3. The Renaissance. Two hours a week. (Omitted in 1903-1904.)

4. The Reformation,—1563.

The main motives of this course will be found in the development of the religious schism, and in the relations of scholarship with theology.

Two hours a week.

5. The Seventeenth Century. Three hours a week. (Omitted in 1903-1904.)

6. The Political and Constitutional History of Europe since 1789. **Honours. Fourth Year.**

In this course narrative history will be subordinated to a description of the leading types of government which have been established in Europe since the beginning of the French Revolution. The constitutional changes of France, Germany, Italy, Switzerland and Austria-Hungary will be rendered most prominent.

Four hours a week.

7. English Constitutional History—1307. Two hours a week. (Omitted in 1903-1904.) **Honours. Third and Fourth Years**

8. The Political and Constitutional History of the United States and Canada. Four hours a week. (Omitted in 1903-1904.)

9. Historical Seminary. Two hours a week.

Texts.—Honour Students in History will be examined at the end of the Third Year on the following texts:—

Herodotus, VI—VIII, Macaulay's trans.; Thucydides, I, II, 1—65, VI, VII, Jowett's trans.; Plato, The Republic, Jowett's trans.; Plutarch, The Lives of Aristides, Themistocles, Pericles and Timoleon, Clough's trans.; Polybius, I, II, V, Shuckburgh's trans.; Livy, XXI-XXII, Church and Brodribb's trans.; Tacitus, Annals II, Germania, Vita Agricolae, Church and Brodribb's trans.

Honour students in History will be examined at the end of the Fourth Year on the following texts:—

Clarendon, History of the Rebellion, Book XI; Gibbon, Decline and Fall, chaps. XLIV, L, LI, LXVI; Burke, Reflections on the French Revolution; Macaulay, History of England, chap. III; Bagehot, The English Constitution; Stubbs, Select Charters, Introduction; Captain Mahan, The Influence of Sea Power on History; Langlois et Seignobos, Introduction aux Etudes Historiques, trans. G. G. Berry; Bryce, The American Commonwealth, Vol. I; Parkman, Montcalm and Wolfe.

Summer Readings.—All students in History are expected to follow a course of Summer Readings as a preparation for the work of the ensuing session. Special programmes will be drafted with a view to individual needs.

Honour Courses in History and Economics.—A combined course for Honours in History and Economics is now offered, with a choice between studies (A) chiefly in history and politics,

and (B) chiefly in economics and politics. The courses of lectures prescribed for Honour Students are as follows:—

A. 3rd Year.—History, 2, 4, 9;
Political Science, 6;
Economics, 1.
4th Year.—History, 4, 6, 9;
Political Science, 7 or 8;
Economics, 2, 3.*

B. 3rd Year.—Economics, 1, 4, 5;
Political Science, 6;
History, 2.
4th Year.—Economics, 2, 3, 4, 5;
Political Science, 7, 8;
History, 4, 9.

Economics and Political Science.

PROFESSOR :—A. W. FLUX, M.A.
LECTURER :—STEPHEN B. LEACOCK, B.A.

Ordinary Third or Fourth Year.

1. ELEMENTS OF ECONOMICS.

The scope and method of Economic Science; the organization of production; the theory of value; the distribution of wealth, including the theories of rent, wages, interest and profits; exchange and the mechanism of exchange; the theory of money; international trade; principles of taxation.

Four hours per week throughout the Session.

Text-book:—F. A. Walker, Political Economy (Advanced Course).

For further reference:—Keynes, Scope and Method of Political Economy; Hadley, Economics; Marshall, Principles of Economics; J. S. Mill, Principles of Political Economy, Book III; Jevons, Money and the Mechanism of Exchange; Bastable, Theory of International Trade; Sidgwick, Principles of Political Economy, Book III.

Honours. Fourth Year.

2. HISTORY OF ECONOMIC THEORY.

The development of economic doctrine will be traced, especially in relation to the special contributions of individual writers of great prominence. A closer examination of economic theories treated of in the preceding course will be made.

* For Economics 2 or 3, may be substituted Art and Archaeology (half course) or History of Philosophy (half course).

Text-books:—Price, Short History of Political Economy in England; Cohn, History of Political Economy.

Works of Reference:—Cossa, Introduction to the Study of Political Economy; Ingram, History of Political Economy; Sewell, The Theory of Value before Adam Smith; Cannan, History of the Theories of Production and Distribution; together with the treatises of writers named, or referred to, above.

Four hours per week during the first half of the Session.

3. (*a*) Currency, Banking and Trade.

Honours. Fourth Year.

Half course of 50 lectures (Omitted in 1903-04).

(*b*) The Theory of Distribution.

An examination of the theories of wages, rent and profits.

Works of Reference:—Clark, The Distribution of Wealth; Commons, The Distribution of Wealth; Hobson, The Economics of Distribution; Walker, The Wages Question; Taussig, Wages and Capital; Böhm-Bawerk, Capital and Interest; Leroy Beaulieu, Essai sur la Repartition des Richesses.

Four hours per week during the second half of the Session.

4. Seminary in Economics.

In connection with courses 2 and 3, a study of the writings of leading economists will be carried on, reports made, and methods of investigation illustrated practically. Opportunity will also be afforded for corresponding work in connection with courses 5, 7 and 8 (see below). The meetings of the Seminary will be weekly.

5. (*a*) History of Industry and Commerce.

Honours. Third and Fourth Years.

Two hours a week (omitted in 1903-04).

(*b*) Public Finance.

State expenditures, with a discussion of the relations between those of central and local governments; public revenues, forms of taxation, incidence of taxation; public debts; financial administration.

Two hours per week throughout the Session.

Text-book:—Plehn, Introduction to Public Finance.

Works of Reference:—Bastable, Public Finance; Adams, The Science of Finance; Cohn, The Science of Finance; Leroy Beaulieu, Traité de la Science des Finances; Seligman, Essays in Taxation and The Shifting and Incidence of Taxation; Adams, Public Debts.

Ordinary. Third or Fourth Year.

6. Elements of Politics.

The introductory part of the course will deal with the general principles of Political Science, the nature of the State and the different theories of its purpose and origin.

The main work of the year will consist of a study of comparative national government. The constitutions, governments and political parties of Great Britain and the United States will be treated in detail. The governmental systems of continental Europe will also be examined.

Four hours per week throughout the Session.

Text-book:—The State (Woodrow Wilson).

Books of Reference:—Sidgwick, Elements of Politics; Burgess, Political Science and Constitutional Law; Anson, Law and Custom of the Constitution; Bryce, American Commonwealth; Bodley, France; Lowell, Governments and Parties in Continental Europe.

Honours. Fourth Year.

7. Legislative Policy.

A half course of 50 lectures. This course will consist of a detailed examination of the functions exercised by the State in industrial control. Modern legislation and legislative theories will be discussed in reference to their economic effects. Reports by members of the class upon special topics will be made a prominent feature of the work.

Four hours per week during the first half of the Session.

Books of Reference:—Leroy Beaulieu, The Modern State; Sidgwick, Elements of Politics, chaps. IV, IX, X; Farrar, The State in Relation to Trade; Jevons, The State in Relation to Labour; Frankenstein, Der Arbeiterschutz, seine Theorie und Politik.

Honours. Fourth Year.

8. History of Political Theory.

A half course of 50 lectures. Only a brief summary of Ancient and Mediæval political philosophy will be attempted. The chief part of the course will be devoted to the political speculation of the 18th and 19th centuries.

Four hours per week for the second half of the Session.

Books of Reference:—Sir F. Pollock, History of the Science of Politics, and the political works of Hobbes, Locke, Montesquieu, Rousseau, Burke, Bentham, J. S. Mill, Herbert Spencer, Bluntschli, and Sir Henry Maine.

Summer Readings.—Students who intend to follow the Honour course in Economics and Political Science are advised to read, during the summer vacation preceding the commencement of that course, the books prescribed for the Scholarship examination in those subjects (see p. 57).

During the summer vacation following the Third Year they are advised to study the following books:—

Adam Smith, Wealth of Nations; Ricardo, Principles of Political Economy and Taxation; J. S. Mill, Principles of Political Economy; and such of the works referred to in connection with course 8, (see p. 102), as may be available for use.

Honour Courses.—Students of the Third Year who are candidates for Honours in History and Economics, and select Course B (see p. 100), will take the following courses of lectures: History, 2; Economics, 1, 4, 5; Political Science, 6. Students of the Fourth Year who are candidates for Honours in History and Economics, and have selected Course B, will take the following courses of lectures: History, 4, 9; Economics, 2, 3, 4, 5; Political Science, 7, 8.

Constitutional Law.

Professor:—F. P. Walton (Dean Faculty of Law.)

The Constitutional Law of Canada will be treated in the following order:—1. Canadian Constitutional History prior to Confederation. 2. The British North America Act, and the leading cases under it which illustrate the respective powers of the Dominion and the Provinces. 3. The fundamentals of English Constitutional Government which form the basis of the Canadian Constitution. 4. The Cabinet System. 5. The difference between English and French practice as to responsibility of officials.

Two hours a week.

Roman Law.

Lecturer:—F. P. Walton (Dean Faculty of Law).

1. A Course is offered in Roman Law, open to Third and Fourth Year students in Arts, and qualifying as an option for the B.A. degree. For details, see p. 220.

Art (History of) and Archæology.

LECTURER:— ————————

The course comprises two sessions' work, a half-course (of fifty lectures) being given each session. The lectures, which are illustrated by photographs, casts, lantern-slides, and diagrams, are delivered in the Architecture class-room, Engineering Building, on Monday and Thursday, at 4 p.m.

The fee for the full course is $25.00; for each half-course, if taken separately, $14.00 (including Grounds and Athletics).

For Session 1900-1901 the course comprised a general survey of the architecture and sculpture of the ancient world (Egypt, Assyria, Greece and Rome).

In 1901-02, the first term was devoted to the architecture of the late Roman Empire and of the Early and Later Middle Ages; in the second term the class studied the Painting of the Renaissance in Italy.

In 1902-03 the course was devoted to Greek sculpture and classical architecture, with special lectures upon the topography of ancient Athens and Rome.

In Session 1903-04 the first term will be devoted to a study of mediæval architecture and the allied arts; in the second term the history of Painting will be resumed for the Northern Schools of Europe.

In addition to the class lectures, candidates are expected to show a knowledge of the text-books prescribed and of portions of the books of reference, as indicated in connection with the lectures. A certain number of class essays are prescribed during the session.

Text-Books:—Baldwin Brown, "The Fine Arts" (Murray; Scribner); Von Reber, "History of Mediæval Art" (Harper); any good manual of the history of Painting, such as Poynter's (Sampson Low) or Van Dyke's (Longmans).

Mental and Moral Philosophy.

PROFESSOR OF MENTAL PHILOSOPHY :— ————————
" " MORAL " ————————

LECTURERS :— HILDA D. OAKELEY, M.A.
J. W. HICKSON, M.A., PH.D.

Ordinary. Second Year.

1 A. In the first term a course on Elementary Psychology. While discussing the phenomena of sensation, and the elementary processes of mental evolution, the lectures also introduce

the student to the principles and methods involved in the study of more advanced philosophical problems. While the course follows in its general outline Book I. in Murray's Handbook of Psychology, the student is made acquainted with the leading works in psychological literature, and is expected to study the passages recommended. Occasional essays also are prescribed.

1 B. In the second term a course in Formal Logic and the Fallacies as in Hyslop's Elements of Logic. The lectures endeavour to show the application of logical processes to actual discussion, with special attention to common fallacies exemplified in literature and daily life.

In addition, students will be required to consult Sidgwick, Fallacies; and Lafleur, Illustrations of Logic.

Both classes meet three hours a week.

Advanced Sections. Second Year.

2 A. This course will comprise the following divisions:

a General Introduction to Philosophy; The Origin of Philosophy amongst the Greeks;

b Explanation of the fundamental methods of thought or the principles underlying conception, judgment and inference;

c Analysis of Berkeley's Dialogues between "Hylas and Philonous" as introduction to the Psychological Problem; Perception of a Material World.

Books recommended:—Sidgwick's Introduction to Philosophy; A Dialogue of Plato; Berkeley's Dialogues between Hylas and Philonous.

Writing of papers expected from time to time.

Two hours a week throughout the session.

2 B. General Psychology, including the Elements of Psychophysics.

No text-book is prescribed, but students will be referred to Wundt's Outline of Psychology, and to James' Principles of Psychology.

One hour a week throughout the session.

Ordinary. Third or Fourth Year.

3 A. In the First Term a course on the Logic of Scientific Method, including an examination of the fundamental Conceptions and Principles of the Physical and Historical Sciences. In addition to Jevons' Principles of Science and Mills' System of Logic (Books III and VI) students will be referred to Pearson's Grammar of Science, 2nd ed., and to the writings of E. Mach.

Four hours a week.

3 B. In the Second Term an advanced course on the Psychology of Cognition, tracing, as far as possible, the principal stages in the evolution of intelligence. The general problem, also, of the nature of knowledge is discussed, in view of the light which it throws on the ultimate nature of reality. The principal topics are indicated in Murray's Handbook of Psychology, Book II; but students are expected also to study selected passages from the most important works on Psychology.

Four hours a week.

4 A. History of Modern Philosophy.

First Term: From the Renaissance to Kant.

Four hours a week.

4 B. Second Term: From Kant to the Present Time.

Text-books recommended:—Falckenberg's History of Modern Philosophy; Höffding's History of Modern Philosophy (2 vols. translated by Meyer); Adamson's Lectures on Modern Philosophy.

Four hours a week.

5 A. In the First Term a course on Moral Philosophy, discussing the problem of Ethical Theory.

Four hours a week.

5 B. In the Second Term a course on Applied Ethics.

While these courses follow in general outline Murray's Introduction to Ethics, the student is expected to read portions of other works recommended.

Four hours a week.

N.B.—In all the classes of Logic, Metaphysics and Moral Philosophy, students are required to write essays or to perform exercises.

Honours. Third Year.

Candidates for Honours are required to take the ordinary course in Philosophy and the ordinary course either in Economics or in Political Science in one year.

6. A course in Greek Philosophy. This begins with the colonial period, during which philosophical activity was most energetic among the colonies of the Greeks in Asia Minor and Italy. It then passes on to the Athenian period, beginning about the middle of the fifth century B. C., when Philosophy found a home in the greatest centre of intellectual life in the ancient

world. A third period is then described, during which Philosophy extends its culture over ancient life by the spread of the great schools, especially the Stoical and the Epicurean, which arose towards the end of the fourth century, B. C. Finally, some account is given of the movement, of which Alexandria was the centre and by which Greek Philosophy was brought into contact with Oriental thought. The history is carried down to the closing of the Pagan Schools in Athens by the Emperor Justinian. Students are expected to make an independent study of the fragments of one of the early philosophers, and to write an essay embodying the results of their study.

Books of Reference: Zeller, History of Greek Philosophy, and Windelband, History of Ancient Philosophy.
Two hours weekly.

7. Plato and Aristotle. In this course it is expected that some work of at least one of these thinkers will be read.
For 1903-4 the Theaetetus is prescribed.
One or two hours weekly.

8. English Empiricism, Idealism and Criticism. This course will consist in reading and discussing the principal portions of Locke's Essay concerning the Human Understanding (Books 1, 2, 4), Berkeley's Principles of Human Knowledge, Hume's Inquiry and portions of the Treatise on Human Nature.
Two hours a week.

9. Theory of Knowledge. This course will be both historical and critical.

Books recommended:—Seth's Scottish Philosophers, Lotze's Logic and selected portions of Bradley's Logic, Bosanquet's Logic and Ritchie's Darwin and Hegel.
One or two hours a week.

Honours Fourth Year.

10. Reading and discussion of Kant's Prolegomena and portions of the Critique of Pure Reason, as an introduction to Kantian Philosophy. In connection with this course the following works are recommended: Morris, Kant's Critique of Pure Reason, 3rd edition (Grigg's Philosophical Classics), Caird's Critical Philosophy of Kant, 2nd edition, and Adamson's Lectures on Kant.
Two hours weekly.

11. The Principles and Methods of Ethics.

Books recommended:—Aristotle, Nichomachean Ethics; Sidgwick, Method of Ethics; Green, Prolegomena to Ethics.

Two hours a week.

12. An Introduction to Philosophy. An advanced course dealing with fundamental problems of Metaphysics and with leading types of philosophical theory, such as Materialism, Idealism, Dualism, and Monism. There will be opportunity for informal discussions.

Books of Reference:—Külpe's Introduction to Philosophy; Watson's Outline of Philosophy; Riehl's Theory of Science and Metaphysics (translated by Fairbanks).

Two hours weekly in second term.

In addition to the above mentioned courses there will be an examination at the end of the session on some book or books to be read privately by students. Subjects for the session 1903-4: Spinoza's Ethic, Schopenhauer's Principle of Sufficient Reason and World as Will and Idea.

Students are required to write an essay on Leibnitz's Critique of Locke in the *Nouveaux Essais*.

(NOTE.—*The above programme of studies in Mental and Moral Philosophy is subject to modification on the appointment of the new Professors.*)

Mathematical and Physical Sciences.

(*a*) MATHEMATICS.

PROFESSOR (MATHEMATICS AND ASTRONOMY) :—
JAMES HARKNESS, M.A.

ASSOCIATE PROFESSOR:—H. M. TORY, M.A., D.Sc.

LECTURER :—MURRAY MACNEILL, M.A.

(*b*) PHYSICS.

PROFESSORS :— JOHN COX, M.A.
E. RUTHERFORD, M.A., D. Sc.

ASSISTANT PROFESSOR :—HOWARD T. BARNES, D.Sc.

DEMONSTRATORS :—C. C. SCHENK, PH.D., S. J. ALLAN, B.Sc.

Ordinary. First Year.

1. MATHEMATICS—Arithmetic.—Euclid, Books 1, 2, 3, 4, 6 (omitting propositions 27 ,28, 29), with definitions of Book 5, Hall and Stevens:—Hall and Knight's Elementary Algebra (omitting Chapters 36, 40, 41, 42); or

the same subjects in similar text-books.—Hall and Knight's or Locke's Elementary Trigonometry. Nature and use of Logarithms.
Four hours a week.

2. PHYSICS.—This course has two objects: (1) to give the minimum acquaintance with Physical Science requisite for a liberal education to those whose studies will be mainly literary; (2) to be introductory to the courses in Chemistry and other branches of Natural Science, and to the more detailed courses in Physics in the Third and Fourth Years. Only the most important principles in each branch of the subject will be treated, as far as possible with reference to their historical development and mutual relations; and they will receive concrete illustration in the study of the principal instruments in daily use in the laboratory. Two illustrated lectures will be given per week. During the session each student will be required to attend in the laboratory eight times, and make measurements involving the use of the following instruments:—*Balance, Pendulum, Barometer, Thermometer, Sonometer, Telescope or Microscope, Tangent Galvanometer, Wheatstone's Bridge.*

Outline of Syllabus. The scope and method of Science, Primary Phenomena ("States and Properties of Matter"), Motion, Velocity, Acceleration, Laws of Motion, Momentum, Energy, Work. The Parallelogram Law for Velocities and Forces, Equilibrium and the Simple Machines. Uniform circular motion, Vibration, the Pendulum, Fluid Pressure, the Barometer, Specific Gravity. Summary of *Mechanics*, indicating the principle of the Conservation of Energy.

The missing Energy traced in (1) *Sound.* Nature of wave Motion. Intensity, Pitch and Quality of Musical Notes. The stretched String and Organ Pipe. Resonance.

(2) *Heat.* Temperature and the Thermometer. The Calorimeter, Fusion and Vaporisation. Laws of Boyle and Gay-Lussac. The Mechanical Equivalent. Application of Conduction, Convection and Radiation to common problems of Climate, Ventilation, etc.

(3) *Light.* Reflection, Refraction, the Spherical Mirror, Prism, Lens, Microscope, Telescope, Spectroscope, Polariscope. Principle of Interference and sketch of the Undulatory Theory.

(4). *Electricity and Magnetism.* The Electrophorus, the Modern Induction Machine, the Condenser. Coulomb's Law of Force. The idea of Potential. The Quadrant, Electrometer. Atmospheric Electricity. Magnetic Pole, Moment, Field and Law of Force. The Compass and Terrestrial Magnetism. Effects of Current. The Voltameter and Storage Cell. The Galvanometer. Heating Effects. Simple Batteries. Ohm's Law. Units and Measurement of Current Resistance, Electromotive Force, Mutual Mechanical Effects of Conductors and Magnetic Fields. Principle of the Electric Motor. The Electro-magnet. Induction of Currents, and Principle of the Dynamo. Applications to Telegraph, Telephone, Lighting, and supply of Power.

Conclusion.—Restatement of Principle of Conservation of Energy in complete form. Dissipation of Energy.

Two hours a week.

Second Year.

3. A. MATHEMATICS.—Algebra.—Exponential and Logarithmic series; Undetermined Coefficients; Partial Fractions; Elementary Theory of Probabilities; Elements of Determinants; Geometrical Conic Sections—Solid Geometry (Euclid, Bk. XI and first two props of Bk. XII, or equivalent):—Spherical Trigonometry (Solution of Spherical Triangles with proofs of the necessary preliminary propositions and formulae).

Text-books:—Hall and Knight's Higher Algebra; Wilson's Solid Geometry and Conic Sections.

Two hours a week.

3. B. DYNAMICS.—This course is chiefly experimental, and deals with:—Range and Time of Flight of Projectiles; Morin's Machine; Laws of Direct Impact of Elastic Bodies; Simple Harmonic Motion; Simple and Compound Pendulum; Determination of Gravity; Moments of Inertia, and their Experimental Determination; Moment of Momentum, and Energy of a Rotating Body.

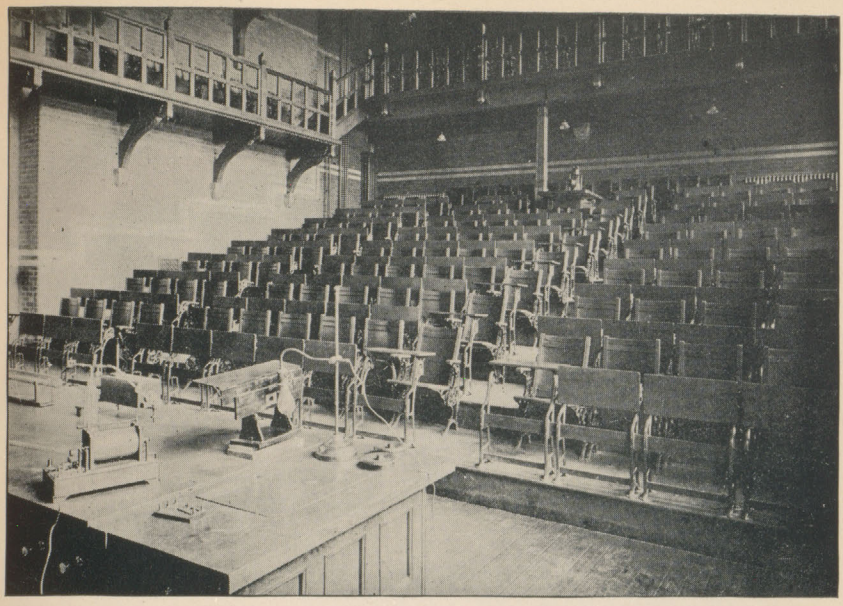
One hour a week.

Third or Fourth Year.

4. MATHEMATICS.—Elementary Analytical Geometry; Elementary parts of the Differential and Integral Calculus; Simple Differential Equations.

Four hours a week.

ASTRONOMY AND OPTICS.—Two hours a week. Half course.



Macdonald Physics Building.—A Lecture Theatre.



Macdonald Physics Building.—An Elementary Electrical Laboratory.

5. A. Astronomy.—Galbraith and Haughton's Astronomy or Brinkley by Stubbs and Brünnow. Lockyer's Elementary Astronomy (English edition), and Gall's "Easy Guide to the Constellations" are recommended as introductory.—The subject is taken with Optics as a half course. The lectures will be given before Christmas. First term; two hours a week.

5. B. Optics.—Two hours a week, from January to end of Session. *Text-book*:—Galbraith and Haughton.

6. Mechanics and Hydrostatics.—*Text-book*:— Loney, Mechanics. Half course. **Third Year.**

7. A. Experimental Physics.—(*First Course.*)—Laws of Energy, Sound, Light and Heat. *Text-books*:—Deschanel, Part IV, or Ganot or Jones; Heat (Wright's, Longmans).
Lectures fully illustrated; two hours a week, with Laboratory Course, three hours a week.
Laboratory Manuals.—Pitcher and Tory; Chandler.

7. B. Sound.—Velocity of Sound; Determination of Rates of vibration of Tuning Forks; Resonance; Laws of vibration of strings.

7. C. Light.—Photometry; Laws of Reflection and Refraction; Indices of Refraction; Focal Lengths and Magnifying Powers of Mirrors, Lenses, Telescopes and Microscopes; the Sextant, Spectroscope, Spectrometer, Diffraction Grating, Optical Bench and Polariscopes.

Heat.—Construction and Calibration of Thermometers; Melting and Boiling Points; Air Thermometer; Expansion of solids, liquids and gases; Calorimetry; Specific and Latent Heats; Laws of Vapour Pressure; Radiation; the Mechanical Equivalent of Heat.

8. Experimental Physics.—(*Second Course.*)—Electricity and Magnetism. *Text-book*:—Ganot or S. P. Thompson. **Fourth Year.**
Lectures fully illustrated; two hours a week, with Laboratory Course, three hours a week.
Laboratory Manual—Pitcher and Tory.

Measurement of Pole Strength and Moment of a Magnet; the Magnetic Field; Methods of Deflection and Oscillations; Comparison of moments and determination of elements of Earth's magnetism. Frictional Electricity. Current Electricity—Complete course of measurements of Current Strength, Resistance and Electromotive Force; Calibration of Galvanometers; the Electro-dynamometer; Comparison of Galvanometers; the Electrometer; Comparison of Condensers; Electromagnetic Induction.

N.B.—For advanced Courses intended for Electrical Engineering Students and Graduates pursuing the study of Physics, see Calendar, Faculty of Applied Science.

(a) Mathematics.

Advanced Sections. First Year.

9. MATHEMATICS.—Hall and Stevens, Euclid; Casey, Sequel to Euclid; Hall and Knight, Advanced Algebra; Todhunter or Burnside and Panton, Theory of Equations (selected course). Two or three hours each week.

Second Year.

10. MATHEMATICS—Lock, Higher Trigonometry, with McClelland and Preston, Spherical Trigonometry, Part I; Salmon, Conic Sections, chapters 1, 2, 3, 5, 6, 7, and 10 to 13 inclusive; Williamson, Differential and Integral Calculus (selected course).
Four hours a week.

(b) Mathematics and Natural Philosophy.

Honour Courses. Third and Fourth Years.

11. MATHEMATICS.—Williamson, Differential and Integral Calculus; and Boole or Forsyth, Differential Equations, or Salmon, Geometry of Three Dimensions (alternate years); Quaternions (Kellund and Tait).
ASTRONOMY.—Godfray.
Two hours a week.

Third Year

12. MATHEMATICAL PHYSICS.—Minchin, Statics, Vol. I (selected chapters); Williamson and Tarleton, Dynamics. Chaps. 1 to 8, inclusive; Besant, Vol. I, Hydro-Mechanics, Part I, chaps. 1, 2, 3, 7; Parkinson, Optics.
EXPERIMENTAL PHYSICS.—Course 7.
Two hours a week.

13. Physical Astronomy.—Godfray, Lunar Theory; or Cheyne, Planetary Theory; Newton, Principia, Lib. I, secs 9 and 11, with the necessary preliminary propositions. **Fourth Year.**

14. Mathematical Physics.—Minchin, Statics, Vol. II, selected chapters; Williamson and Tarleton, Dynamics; Routh, Dynamics of a Rigid Body (for reference); Besant, Hydro-Mechanics; Preston, Theory of Light; Cumming, Theory of Electricity.

Experimental Physics.—Course 8.

Special courses for Graduates and Advanced Students will be delivered during the Session 1903-4, by Professors Cox and Rutherford, at hours to be arranged. Subjects—The Relations between Optics and Electricity; and Radioactivity.

(c) Experimental Physics.

15. Courses 7, 8, (10 hours a week. Elements of the Calculus; Simple Differential Equations; Elements of Analytical Geometry, Elementary Dynamics of a Particle; Elementary Rigid Dynamics. **Honour Courses. Third Year**

16. Advanced Courses in Heat, Optics and Electricity. A short course in Physical Chemistry. **Fourth Year.**

(Note.—*The programme of studies in Mathematics is subject to modification on the appointment of the new Professor.*)

Chemistry.

Professors :—B. J. Harrington, M.A., Ph.D., LL.D.
J. Wallace Walker, M.A., Ph.D.
Assistant Professor :—Nevil Norton Evans, M.A.Sc.
Demonstrators :— A. Douglas McIntosh, M.A.
Bertram D. Steele, D.Sc.
E. H. Archibald, A.M., Ph.D.
Lecture Assistant :—M. Violette Dover, B.A., M.Sc.

1. General Chemistry.—A Course of lectures on Elementary Chemical Theory, and on the principal elements and their compounds. The lectures are fully illustrated by means of experiments. **Second Year.**

Text-book:—Newth's Text-book of Inorganic Chemistry.

Three hours a week.

ELEMENTARY PRACTICAL CHEMISTRY.—This course is compulsory for all undergraduates taking the above course of lectures. The work includes experiments illustrative of the Laws of Chemical Combination, the Preparation of Pure Chemical Compounds, and elementary Qualitative Analysis.
Six hours a week.

Third Year.

2. INORGANIC CHEMISTRY.—An elementary course on special departments of Inorganic Chemistry.
Two hours a week during the first term.

3. ELEMENTARY ORGANIC CHEMISTRY.—An elementary course of lectures on Organic Chemistry open to Biological Students and compulsory for students intending to take the advanced course on Organic Chemistry in the Fourth Year.
Text-book.—Hollman's Text-book of Organic Chemistry.
Two hours a week during the second term.

4. ADVANCED PRACTICAL CHEMISTRY.—Laboratory practice in methods of gravimetric, volumetric and electrolytic Quantitative Analysis, during the first term, and preparation of simple Organic Substances in the second term.

Note.—Extra reading and laboratory work will be required from Honour Students.

The Organic Laboratory will be open during the Second Term for Biological Students who desire to obtain an elementary knowledge of the methods employed in preparing Organic Substances.

Fourth Year.

5. ORGANIC CHEMISTRY.—A systematic course of lectures on Organic Chemistry, including the Analysis of Organic Substances, Calculation of Formulæ, Determination of Molecular Weights, Polymerism, Isomerism, etc., followed by a discussion of the more important derivatives of the Aliphatic and Aromatic Series of Compounds. Students intending to enter the Medical Faculty would find this course of great advantage.
Two hours a week.

6. Practical Organic Chemistry.—A complete course on the preparation and analysis of Organic Substances, with determinations of Molecular Weights, etc.

7. Physical Chemistry.—The lectures on Physical Chemistry are divided into two parts. In the first term they include a study of such physical properties of gases, liquids, and solids as are known to depend upon their Chemical Constitution, Thermo-chemistry and the Law of Mass Action. The second term is devoted to Electro-chemistry. The lectures will be based upon the applications of the gaseous laws to solutions.

8. Practical Physical Chemistry.—Laboratory work will include the various methods of determining the Molecular Weights of gases and of substances in solution, accurate measurement of Densities, Refractive Indices, Surface Tensions and Specific Rotations; also examples of Chemical Statics and Kinetics, and Electro-chemical measurements.

9. Mineral Analysis.—A course of laboratory work comprising advanced quantitative analysis and investigation of the constitution of mineral species.

Honour Courses. Third Year.

(1) Chemistry, 2, 3, 4; (2) Experimental Physics; (Course 7); and one of the following:—Mechanics (Course 6 A), with Differential and Integral Calculus (4 hours a week for the first half of second term or 2 hours a week for whole term), or Biology, or Geology, or Mineralogy.

Fourth Year.

(1) Chemistry, 5, 6, 7, 8; or 7, 8, 9; (2) Experimental Physics (Course 8).

Mineralogy.

Professor:—B. J. Harrington, M.A., Ph.D.

Honours. Third Year.

1. Mineralogy.—Lectures and demonstrations illustrated by models and specimens in the Peter Redpath Museum and the Macdonald Chemistry and Mining Building. Among the subjects discussed are: Crystallography; physical properties of minerals dependent upon light, electricity, state of aggregation, etc.; chemical composition, calculation of mineral formulæ, quantivalent ratios, etc.; principles of classification, description of species.

Two hours a week.

Fourth Year.

2. MINERALOGY (In continuation of No. 1).—Description of species, particular attention being paid to those which are important as rock constituents and to the economic minerals of Canada.

First term, two hours a week.

Third Year.

3. DETERMINATIVE MINERALOGY.—Laboratory practice in blow-pipe analysis and its application to the determination of mineral species. This work is carried on in the new laboratory provided for the purpose in the Chemistry and Mining Building.

Thursday, 2 to 5 p.m.

Elementary Biology.

PROFESSORS :—D. P. PENHALLOW, M.Sc.
E. W. MACBRIDE, M.A., D.Sc.

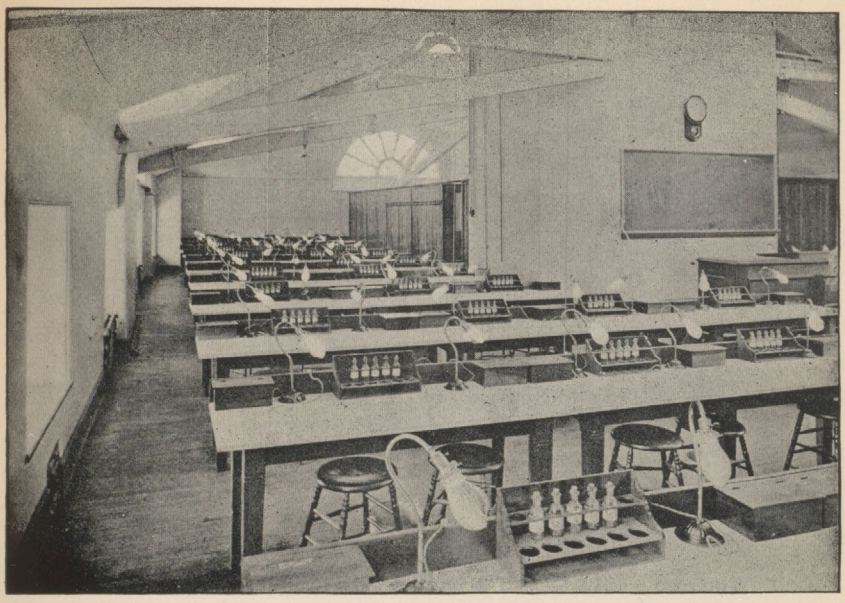
Second Year.

This course is designed for those who may wish an introduction to the principles of general biology, but who cannot carry such work beyond the limits of an elementary course; for students in Arts proceeding to Medicine; and also for those who may wish to take the more advanced work of the Third and Fourth Years to which it will be introductory.

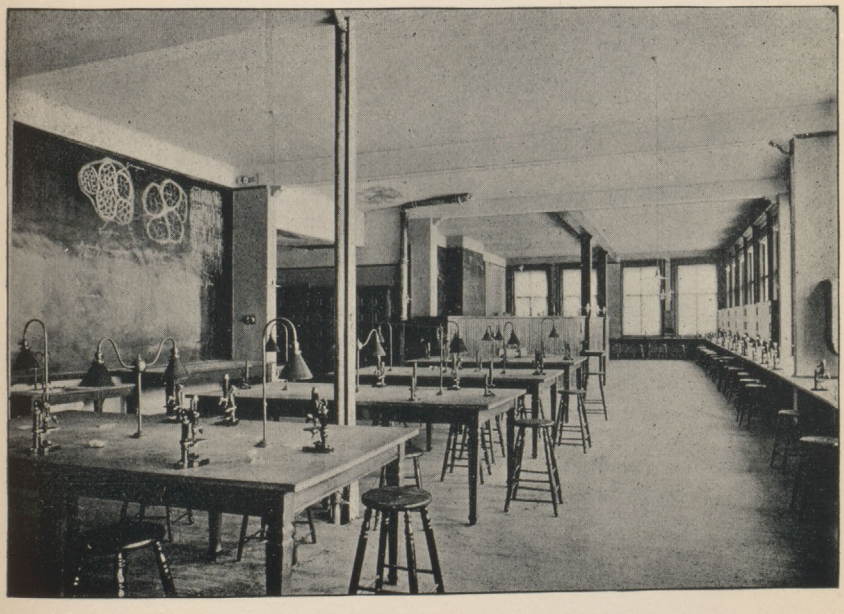
A. ZOOLOGY.—First half session. This course will commence the study of a selected number of types, leading up to and including the rudiments of vertebrate anatomy and forming an introduction to the more systematic work of the Third and Fourth Years. The types selected are Amœba, Paramœcium, Hydra, Lumbricus, Scyllium, and Rana.

B. BOTANY.—Second half session. A course in the general morphology of plants embracing a discussion of the general principles of morphology and classification, respiration, photosynthesis, nutrition, reproduction, symbiosis and adaptations, as also the relations of plants in geological time. These studies will be illustrated by means of special types taken from the principal groups, and emphasis will be given to a study of the flowering plants, including herbarium work, determination of species and geographical distribution.

This course is designed with special reference to those who may not be able to carry such work beyond the limits of an



In the Zoological Laboratories.



Laboratory of Normal Histology.

elementary course, where it will form the basis for more specialized work in the Third and Fourth Years.

Two lectures and two laboratory periods each week.

C. Continuation Course in Animal Biology.—Students taking the combined six-year course leading to the degrees of B.A. and M.D. or B.Sc. and M.D. may, in lieu of B, take the following course, but in the event of their doing so must complete the Botany required for the Medical course in the autumn term:—

A study of the anatomy and osteology of the Rabbit followed by a detailed study of microscopic structure of its tissues.

Two lectures and two laboratory periods a week during the spring term.

Botany.

Professor:—D. P. Penhallow, M.Sc.
Lecturer:—C. M. Derick, M.A.

1. Plant Biology. (See page 116). This course is introductory to the more specialized work of the Third and Fourth Years, and will be represented by a number of types, including the flowering plants and a determination of species. **Second Year.**

Two lectures and two laboratory periods each week during the spring term.

2. Special Morphology. This course is designed to give a comprehensive knowledge of plant structures and relationships. The principles of development will be illustrated by type studies which may also serve as the basis of more special work in Bacteriology, Physiology, Ecology, or Paleo-botany. It comprises:— **Ordinary. Third Year.**

(*a*) *First Half-Session.* During the autumn term, attention will be directed to a study of the general histology of the plant, with special reference to the seed plants and as a basis for the more advanced work of the Fourth Year, to differential reactions, methods of staining, imbedding, section cutting and general technique.

This course will be especially adapted to chemists as applied to a study of food adulterants, etc.; to those who are intending to follow a medical course, as a preparation for animal histology, and it will be required of all who elect the course in the Fourth Year.

The course presupposes familiarity with the optics of the microscope as given in Physics (3) of the Second Year.

(b) Critical studies of the Thallophyta by means of selected types designed to illustrate the origin of organs, the origin and development of sex, the division of labour and the general laws of development.

Two lectures and two laboratory periods each week throughout the session.

Ordinary. Fourth Year. 3. SPECIAL MORPHOLOGY.

(*a*) The complete study of a selected series of types, illustrating the structure, origin and relationships of the Bryophytes, and Pteridophytes.

(*b*) The special morphology of the Seed Plants as represented by types illustrative of the principal groups, with special reference to relationship, development and adaptations.

Students entering upon this course will be required to present qualifications equivalent to the course of the Third Year.

Two lectures and two laboratory periods each week throughout the session.

For the work of the Third and Fourth Years, each student will be required to provide himself with a laboratory drawing book of specified form, and with necessary pencils, slides and cover glasses.

Ordinary. Fourth Year. 4. SYSTEMATIC BOTANY.—A practical course embracing herbarium work and the systematic study of the seed plants with reference to the determination of species, their environment and mutual relations. These studies will be prosecuted with special reference to a field knowledge of the ferns and flowering plants in the neighbourhood of Montreal.

This course is designed to complete and round out the study of the higher plants as given in the courses on Special Morphology (2 and 3). Students specializing in Botany will be required to follow this as part of the ordinary course of the Fourth Year. The course is also open to teachers of schools and to others who may have gained a knowledge equivalent to that represented by Gray's Structural Botany.

Two hours laboratory each week throughout the session, with field days as may be arranged for.

B.A. Honour Course in Biology.

5. Candidates for Honours in the Third Year will, in addition to the ordinary work of that year, take a special course of reading under the direction of the professor, who will hold a colloquium once each week for the purpose of giving advice and direction in such work. **Honours. Third Year.**

For the Session of 1903-1904, the following works will be read:—Fossil Plants, Seward, Vol. I; Studies in Fossil Botany, D. H. Scott.

6. Candidates for Honours in the Fourth Year will take a course in experimental plant physiology based upon the following works:— **Honours. Fourth Year.**

Pfeffer, Plant Physiology; MacDougall, Experimental Plant Physiology; Darwin and Acton, Practical Physiology of Plants.

Special easy work upon the experiments performed, and upon collateral readings, will be assigned from time to time during the session.

Students will not be permitted to take this course unless they have previously taken the course prescribed for the Second Year.

One lecture and six laboratory hours per week.

B.Sc. Course.

6. Students proceeding to the degree of B.Sc. will be required to take the ordinary course of the Third Year Arts, (2) and also one-half of the Honour course for that year. **Ordinary Third Year**

Two lectures and two laboratory periods each week throughout the session.

Colloquium one hour per week during the spring term.

During the Fourth Year, students proceeding to the degree of B.Sc. will be required to pursue special studies in extension of the work of the Fourth Year Arts, (3), in accordance with such plan as may be adopted by the B.Sc. Committee at the time of his entrance upon that year. **Fourth Year.**

Zoology.

Professor:—E. W. MacBride, M.A., D.Sc
Lecturer:—J. Stafford, M.A., Ph.D.
Demonstrator:—J. C. Simpson.

1A. Animal Biology (see Biology, p. 116). **Ordinary Biology. Second Year.**

This course includes a careful study of the laws of Biology as illustrated by a selected series of types, Special stress is laid on the study of the elements of

vertebrate anatomy and physiology, to which the most of the time is devoted. The types studied are Amœba, Paramœcium, Hydra, Lumbricus, Scyllium and Rana. This course, together with the corresponding course in Botany, constitutes the course in General Biology. It can, however, be taken along with 1 B instead of Botany, by students who are taking the combined six-year course in Arts and Medicine leading to the degrees of B.A. and M.D., and of B.Sc. and M.D.

Two lectures and two demonstrations a week during the autumn term.

1 B. CONTINUATION COURSE IN ANIMAL BIOLOGY.—This course comprises a further study of vertebrate anatomy, including a detailed study of the tissues. The type selected is the Rabbit, of which the osteology and gross anatomy are first studied, and then the finer structure of the tissues. The practical work includes instruction in the staining and mounting of sections.

Two lectures and two demonstrations a week during the spring term.

Ordinary. Third or Fourth Year.

2 A. GENERAL ZOOLOGY.—This course consists of a general survey of the principal classes of animals. It is specially suited to the requirements of those who intend to take geology, and the structure of fossil species is studied along with that of their living representatives.

Two lectures and two demonstrations a week throughout the session.

Ordinary. Third or Fourth Year.

2 B. SPECIAL ZOOLOGY.—This course comprises:—

(*a*) A special study of those groups in the animal kingdom, the members of which are concerned in producing disease.

(*b*) A study of the comparative anatomy of the Vertebrata, with special reference to the osteology.

(*c*) A study of Comparative Embryology, with special reference to the Vertebrata, forming an introduction to Human Embryology.

Two lectures and two demonstrations a week throughout the session.

3. A special course in Embryology, consisting of 8 lectures and 8 periods of laboratory instruction, is given after the con-

clusion of the regular courses of lectures, during the month of April. Though this course is designed specially for the benefit of medical students it is open to all undergraduates in the Faculty of Arts.

Students are required to have taken 1 A and either 1 B or 2 A before proceeding to 2 B. It is in most cases advisable that 1 A should be taken before proceeding to 2 A; but it is possible for the student, by a certain amount of extra reading and laboratory work, to cover the ground required for 2 A, even if 1 A has not been taken.

For all the courses a study of Shipley and MacBride's Text-book of Zoology is required.

B.A. Honour Course in Biology.

(For the Botanical portion of this course, see p. 119).

Honours. Third Year.

4. During the Third Year, students pursuing the Honour course in Biology will take the course 2 A, and in addition pursue a course of reading under the direction of the Professor. The Professor will hold a colloquium once a week in order to supervise the studies of honour students.

The books studied during 1903-1904 will be: Darwin, Origin of Species, and Wallace, Island Life.

Honours. Fourth Year.

5. During the Fourth Year, honour students will take courses 1 B and 2 B, and pursue in addition a course of extra reading, supervised, as in the Third Year, by the Professor.

The books studied during 1903-1904, will be: Romanes, Darwin and after Darwin; and Balfour, Comparative Embryology, Vol. I.

No student is permitted to attend the lectures without taking the practical work. For use in the laboratory, a special note-book and a set of dissecting instruments are required, and will be supplied to the student, who is required to pay a fee of $2.50 *to cover the cost of these.*

6. B.Sc. Course.—Students proceeding to the degree of B.Sc., will in the Third Year be required to take 2 A., and, in addition, a special course of reading under the supervision of the professor during the spring term. In the Fourth Year they will take 2 B., and, in addition, such extra reading and laboratory work as may be required by the B.Sc. Committee.

Geology.

PROFESSOR :—FRANK D. ADAMS, D.Sc., PH.D.

DEMONSTRATOR :—ALFRED W. G. WILSON, M.A., PH.D.

Ordinary Third Year.

1. General Geology.—The lectures will embrace a general survey of the whole field of Geology, and will be introduced by a short course in Mineralogy. Especial attention will be devoted to Dynamical Geology and to Historical Geology including a description of the fauna and flora of the earth during the successive periods of its past history.

The lectures will be illustrated by the extensive collections in the Peter Redpath Museum, as well as by models, maps, sections and lantern views. There will be an excursion every Saturday until the snow falls, after which the excursion will be replaced by a demonstration in the Museum.

Text-book:—Scott, An Introduction to Geology.

Books of Reference:—Dawson, Hand-Book of Geology; Dana, Manual of Geology.

Three hours a week throughout the year, with additional excursions and demonstrations as above stated.

Honours. Third Year.

Honour Course in Geology and Mineralogy.

(For Mineralogical portion of this course, see p. 115).

In the Third Year, students pursuing the Honour Course will take the Ordinary work (General Geology, 1).

Honours. Fourth Year.

In the Fourth Year they will take the following courses (2, 3, 4, 5, 6 and 7.

2. Petrography.—The modern methods of study employed in Petrography are first described, and the classification and description of rocks are then taken up.

One lecture a week during the first term. One afternoon a week throughout the year will be devoted to special microscopical work in the Petrographical Laboratory.

Text-book:—Harker, Petrology for Students.

Books of Reference:—Rosenbusch, Mikroskopische Physiographie, and Rutley, Rock-forming Minerals.

3. A. Palæontology.—An extension of the Palæontology of Course 1, with special studies of some of the more important groups of fossils.

One lecture a week during the second term and one demonstration a week, with special studies in the Peter Redpath Museum.

Books of Reference:—Nicholson and Lydekker, Manual of Palæontology; Zittel, Text-Book of Palæontology.

or

3. B. Physiography.—A description of Land Forms with reference to their origin, classification, drainage, development, climatic and human controls.

The physical features of Canada will be described during the latter half of the course.

The course will consist of lectures, demonstrations, and laboratory work, and will be illustrated by maps, models, and lantern slides.

Two hours a week during the first term.

4. Ore Deposits, Economic Geology and Practical Geology. —The nature, mode of occurrence and classification of Ore Deposits will first be taken up. A series of typical occurrences will then be described and their origin discussed—the more important non-metallic materials—*e.g.*, Fuels, Clay, Abrasive Materials, Building Stones, etc., will be similarly treated, as well as questions of water supply, Artesian Wells etc. The methods employed in carrying out Geological and Magnetic Surveys and in constructing Geological Sections will then be taken up with special studies in folding, faulting, etc.

Four lectures a week throughout the Second Term.

The course will be illustrated by maps, models, lantern slides and specimens.

Text-books:—Geikie, Outlines of Field Geology; Kemp, Ore Deposits of the United States and Canada; Phillips and Louis, A Treatise on Ore Deposits.

Books of Reference:—The Monographs of the U. S. Geological Survey, and the Reports of the Geological Survey of Canada.

5. Canadian Geology.—A general description of the Geology and Mineral Resources of the Dominion.

One lecture a week during the first term.

Text-book:—Dawson, Hand-book of Geology.

Books of Reference:—The Reports of the Geological Survey of Canada.

6. Geological Colloquium.—A discussion each week of some Geological topic, references to the literature of which have been given by the Professor in the week preceding. The course is intended to give students some acquaintance with Geological literature, as well as a wider knowledge of the great principles which underlie the Science.

One hour a week in second term.

7. Geological Survey.—Candidates for Honours in the Fourth Year will also undertake, under the direction of the Demonstrator in Geology, a Geological Survey of some suitable area selected for that purpose. This Survey will occupy two weeks, and will be made either at the close of the Third Year or immediately before the opening of the regular work of the Fourth Year, as may be arranged by the Professor of Geology. The preparation of a geological map of the surveyed area, the examination of the specimens collected, and the writing of a detailed report upon the area, will form part of the work of the Fourth Year.

N.B.—A large amount of additional private reading will also be required of Candidates for Honours.

Students taking any of these courses are entitled to tickets of admission to the Museum of the Natural History Society of Montreal.

Course for B.A. Honours in Geology and Mineralogy.

Third Year.—Geology (ordinary of Third Year).
Mineralogy.
Zoology (ordinary of Third Year).
Chemistry (of Second or Third Year).

Fourth Year.—Geology (Advanced)—Lectures, Lab. work, Field work, Colloquium, Reading.
Mineralogy (Advanced).
Botany (ordinary of Third Year).

Meteorology.

SUPERINTENDENT OF OBSERVATORY :—C. H. MCLEOD, MA.E.

Instruction in Meteorological Observations will be given in the Observatory at hours to suit the convenience of the senior students.

Certificates will be granted to those students who pass a satisfactory examination on the construction and use of meteorological instruments and on the general facts of Meteorology.

Pedagogy.

LECTURER :—PRINCIPAL S. P. ROBINS, M.A., LL.D.

Lectures on this subject will be given in the Normal School to undergraduates of the Third and Fourth Years, who wish to obtain the Provincial Academy Diploma.

Lecture hours, Tuesdays and Fridays, 2 to 3.

Physical Training.

MEDICAL DIRECTOR OF PHYSICAL TRAINING :—
R. TAIT MCKENZIE, B.A., M.D.

The classes will meet at the University Gymnasium at hours to be announced at the commencement of the Session. The Wicksteed Silver and Bronze Medals (the gift of Dr. R. J. Wicksteed) are offered for competition to students of the Graduating Class and to students who have had instruction in the Gymnasium for two sessions,—the silver medal to the former, the bronze medal to the latter. (See p. 44.)

VIII. Laboratories.

The Macdonald Physical Laboratories.

The equipment of the Macdonald Physical Laboratories comprises: (1) apparatus for illustrating lectures; (2) simple forms of the principal instruments for use by the students in practical work (3) the most recent types of all important instruments for exact measurement, to be used in connection with special work and research.

The basement contains the cellars, furnaces, and janitor's department at the west end of the building. The machine room—containing a small gas engine and dynamo, which are fitted for testing, but can also be used for light and power, a motor-alternator and a motor-dynamo—is situated at the extreme western corner of the basement so as to be as far removed as possible from the delicate

magnetic and electrical instruments. Here is also the switch board for controlling the various circuits for supplying direct or alternating current to different parts of the building. The Accumulator Room contains a few large storage cells, charged by the motor-dynamo, which are fitted with a suitable series-parallel arrangement and with rheostats for obtaining and controlling large currents up to 4,000 amperes for testing ammeters and low resistances, etc.

The Magnetic Laboratory contains magnetic instruments and variometers of different patterns, and also a duplicate of the B. A. Electro-dynamometer, which has been completely remodelled and set up with great care for absolute measurements of current. The Laboratory, on the opposite side of the basement contains a very fine Lorenz apparatus for the absolute measurement of resistance, constructed under the supervision of Prof. Viriamu Jones. It also contains a set of Ewing Seismographs and a pair of Darwin Recording Mirrors for measuring small movements of the soil.

There is a Constant Temperature Room, surrounded by double walls, which contains a Standard Rieffler Clock, and is fitted for comparator work.

The ground floor contains at the western corner a small machine shop, fitted with a milling machine and suitable lathes and tools, driven by electric motors, and such appliances as are required for the making and repairing of the instruments, for which the services of a mechanical assistant are retained. There is also a store room for glass, chemicals and cleaning materials, and extensive lockers and lavatories for the use of the students.

The Main Electrical Laboratory is a room 60 feet by 40, and is fitted with a number of brick piers, which come up through the floor, and rest on independent foundations, in addition to the usual slate shelves round the walls. This room contains a large number of electrometers, galvanometers, potentiometers and other testing instruments of various patterns, and adapted for different uses. It connects with a smaller room at the side, in which are kept the resistance boxes and standards, and also the capacity standards. A small research laboratory, adjoining the electrical laboratory, is fitted up for the study of electrical discharge in high vacua, and for work with Rôntgen and uranium radiation, and with ultra-violet light.

The First Floor contains the Main Lecture Theatre, with seats for about 250 students. The lecture table is supported on separate piers, which are independent of the floor. Complete arrangements are provided for optical projections and illustration. The Preparation Room in the rear contains many of the larger pieces of lecture apparatus, but the majority of the instruments, when not in use, are kept in suitable cases in the adjoining apparatus room. On the same floor there is the Heat Laboratory, devoted to advanced work in Thermometry, Pyrometry and Calorimetry, and also to such electrical work as involves the use of thermostats and the measurement of the effects of temperature. There are also two smaller rooms for Professors and Demonstrators.

The Second Floor is partly occupied by the upper half of the Lecture Theatre. There is also an Examination Room for paper work, a Mathematical Lecture Room, with a special apparatus room devoted to apparatus for illustrating Mathematical Physics, and a special Physical Library chiefly devoted to reference books and periodicals relating to Physics. A store room, lavatories and Professors' Room occupy the remainder of the flat.

The Third Floor contains the Elementary Laboratory, a room 60 feet square, devoted to elementary practical work in Heat, Sound and Electricity and Magnetism. There is a Demonstrator's room adjoining, and an optical annex devoted to experiments with lenses, galvanometers, etc., which require a darkened room. On the other side of the building there is a spectroscopic room, containing a six-inch Rowland grating, with mountings by Brashear, and other large spectrometers and polarimeters. Also a series of smaller optical rooms, including a photometric room, specially fitted for Arc photometry, and a dark room for photographic work. Communication between the different flats is facilitated by means of a hydraulic elevator. The building is lighted throughout by electricity, and heated by hot water. The walls are of pressed brick, and the floors of hard maple. There is a ventilating system, consisting of Tobin tubes and suitable exit flues, assisted by a fan in the roof.

The Macdonald Chemical Laboratories.

The main lecture-theatre, extending through two stories, is entered from the ground floor, and seats nearly 250 students. The lecture-table is supplied with coal-gas, oxygen and hydrogen, electricity, water, vacuum, down-draught, etc., and can be well seen from all parts of the room.

Besides the main lecture-theatre, there are three smaller class-rooms, accommodating from 40 to 60 students each.

The three principal laboratories have each a floor-space of about 2,400 square feet, and together have accommodation for nearly two hundred students working at a time. They are lighted on three sides, and have ample hood space. One is intended for beginners, and the others for more advanced work, more particularly in qualitative and quantitative analysis. In connection with each of the main laboratories is a balance-room, equipped with balances by several of the best makers.

Physcal Chemistry is provided for in a special laboratory, nearly 30 by 40 feet, lighted from the north, and supplied with electricity, steam, vacuum pumps, etc. The equipment of this department consists of the apparatus necessary for the determination of the specific gravities of solutions, of the depression of freezing point, and the rise of boiling point, of the densites of gases and vapours. There are constant temperature baths for accurate measurement of solubilities, Kohlrausch's apparatus for determining the electrical conductivity of solutions, and the apparatus necessary for measuring the electro-motive forces generated between metals and their solutions, and in voltaic cells generally. There are also calorimeters for measuring the heat effects produced in chemical reactions. There is on the same floor an optical room furnished with refractometers for measuring the refractive indices of solutions, goniometers, polariscopes and spectroscopes. Other forms of apparatus will be added as required for research work.

Immediately adjoining the laboratory of Physical Chemistry is the Photographic department, supplied with two dark rooms, arranged on the maze system, and supplied with the necessary appliances for all ordinary photographic work, including an enlarging camera. Apparatus for micro-photography will shortly be added to the equipment.

The laboratory for Gas Analysis has a northern exposure, and is fitted with a large tank, to contain water at the temperature of the room, for use in the measurement of gases. The tables are arranged for work with mercury, and the laboratory is supplied with the apparatus of Hempel, Dittmar, Orsat, Elliott, and others. It contains also Fleuss, Boltwood, and Töpler pumps for providing high vacua.

The laboratory for Electrolytic Analysis is supplied with accumulators, thermopile, platinum electrodes, rheostats, ammeters, voltmeters, etc.

Another room has lately been equipped with electric furnaces and other appliances for electro-chemical work.

The Organic Department comprises a laboratory for preparations and research, a combustion room for analysis, a dark room for poloriscope and sacharimeter work, and a lecture room. The laboratory is fitted with all the necessary apparatus for organic research—special hoods for work with poisonous gases, regulating ovens for digesting and drying at various temperatures, filter presses for the extraction of raw materials, and various forms of apparatus for distillation in vacuo. The dark room is equipped with polariscopes and saccharimeters for sugar work. There is a large quantity of the necessary organic chemicals, which are supplied free of charge to students engaged in routine or research work in this department.

The laboratory for Determinative Mineralogy has places for 28 students, and is supplied with abundant material for practical work. It adjoins the lecture-room, in which the lectures on advanced mineralogy are delivered. The mineralogical department is also provided with suitable machinery, run by electricity, for cutting and polishing minerals.

The Library contains a valuable collection of the most recent English, French and German books, and sets of various journals and transactions, including the Berichte der Deutschen Chemischen Gesellschaft, Journal für praktische Chemie, Chemisches Central-blatt, Fresenius' Zeitschrift für Analytische Chemie, Zeitschrift für Anorganische Chemie, Annales de Chimie et de Physique, Journal of the Chemical Society, Journal of Physical Chemistry, American Chemical Journal, Chemical News, Zeitschrift für physikalische Chemie, Zeitschrift für Elektrochemie, Mineralogische und Petrographische Mittheilungen, etc. The library is open to students under such restrictions as are necessary to prevent damage or loss of books.

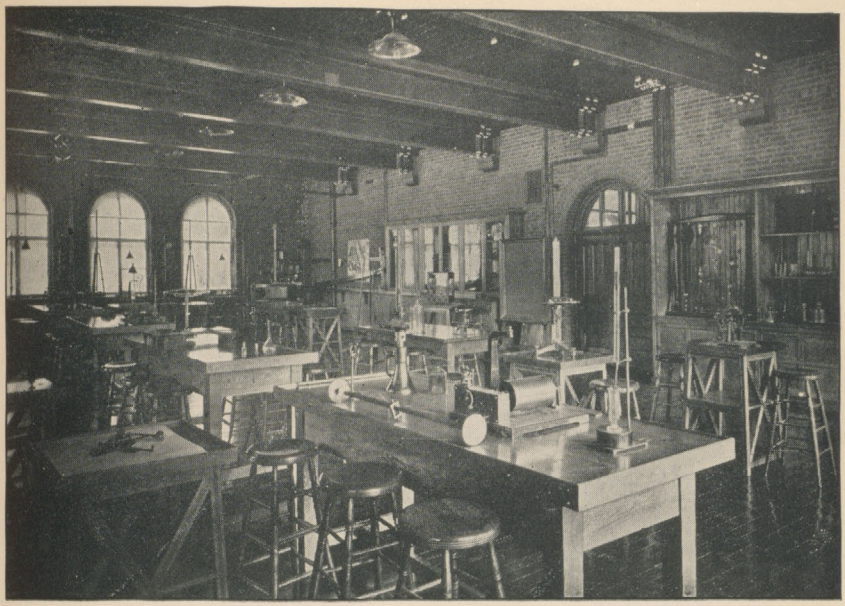
The rooms for allied purposes have, as far as possible, been grouped together on the same floor, and there is a hydraulic lift running from the basement to the attic. The offices and principal laboratories and supply rooms are also connected by a system of telephones. The building is practically fire-proof.

Botanical Laboratories.

The Botanical Laboratories occupy the upper floor of the central Arts building.

The laboratory for general Morphology provides table accommodation for twenty students, and is equipped with all the necessary appliances for the practical study of plants, either fresh or dry.

In connection with this laboratory, a large collection of dried plants is maintained, from which material is drawn for practical work.



Mathematical Laboratory.



Petrographical Laboratory.

The laboratories for special Morphology at present afford accommodation for twelve students. Each table is provided with a complete outfit of instruments and reagents. Provision is also made for accurate micrometric work, and for the production of accurate drawings by means of the camera lucida and Leitz's drawing instrument. More special instruments, including polariscope, spectroscope and photographing apparatus, afford opportunity for detailed studies in these several directions.

An investigator's table held by the University at the Biological Laboratory, Wood's Hall, Massachusetts, is available for such students as may sucessfully complete the advanced course of the Third and Fourth Years.

Zoological Laboratories.

The Zoological Department occupies the whole of the uppermost floor of the east wing of McGill College and the larger portion of the floor immediately below.

It consists of:—

(a). A large laboratory affording accommodation for a class of 90 students.

(b). A smaller laboratory capable of seating about 18 students.

(c) Three smaller laboratories fitted up for purposes of research.

(d). A room fitted up for the University Osteologist.

Dissecting trays, simple and compound microscopes, reasonable quantities of the ordinary reagents and of glass are provided by the department, but students must provide themselves with dissecting instruments, and with razors.

The Department is provided with four large tanks and a number of smaller ones in order to maintain a supply of fresh specimens throughout the winter.

The subjects for practical work, are, so far as possible, selected from species inhabiting the vicinity of Montreal.

The laboratories are well provided with thermostats, microtomes, and other instruments required for advanced research. There is also a small library attached to the department.

A complete set of apparatus for microphotographic work has recently been added to the equipment of the laboratory.

Petrographical Laborator .

The Petrographical Laboratory, containing the chief rock collections of the University, is situated in the Macdonald Chemistry and Mining Building, and is arranged for the use of Honour and Graduate students. It is provided with a number of petrographical microscopes by Seibert and Crouch, as well as with models, sets of thin sections, electro-magnets, heavy solutions, etc., for petrographical work.

For purposes of study and comparison, in connection with advanced work and petrographical investigation, Dr. Adams' extensive private collection of rocks and thin sections is available.

TIME TABLES.—FACULTY OF ARTS.

LECTURES.

First Year—Men.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Latin.	Math.	Math.	French.	Latin.	
10	French.	Greek.	Latin.	Greek.	Greek.	
11	Math.	French.	English.	German.	History.	
12	English.	German.	German.	English.	Physics.	
2	Greek.	Eng. Comp.	French.	Latin.	Math.	
3	Physics.				German.	
4						
5						

First Year—Women.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Greek.	Physics.	Greek.	Greek.	Greek.	
10	English.	History.	French.	French.	Math.	
11	German.	Math.	Latin.	English.	French.	
12	Latin.	Latin.	Math.	German.	Latin.	
2	Math.	French.	German.	Physics.	English.	
3			Eng. Comp.		German.	
4						
5						

Second Year—Men.

Hours.	Monday	Tuesday	Wednesday	Thursday.	Friday.	Saturday
9	German. Hebrew.	Logic.	German. Hebrew.	French.	French.	Chem. Lab.
10	Latin	Latin.	Greek.	German. Hebrew.	Hebrew. German.	Chem. Lab.
11	Math.	Chemistry.	English	Latin.	Math.	Biol. Lab. (*b*) (Botany).
12	English.	Greek.	Chemistry.	English.	Chemistry.	Biol. Lab. (*b*) (Botany).
2	Greek.	Biology.	French.	Math.	Biology.	
3	Chem. Lab.	Biol. Lab. (Zoology).	Latin.	Logic.	Biol. Lab. (Zoology).	
4	Chem. Lab.	Biol. Lab. (Zoology).	Biol. Lab. (*b*) (Botany).	Greek.	Biol. Lab. (Zoology).	
5	Chem. Lab.	French.	Biol. Lab. (*b*) (Botany).		Logic.	

Second Year—Women.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Greek.	Latin.	French.	Latin.	Math.	Chem. Lab.
10	English.	Math.	Math.	French.	Latin.	Chem. Lab.
11	Logic	Chemistry.	German.	English.	German.	
12	German.	Greek.	Chemistry.	Logic.	Chemistry.	
2	Biol. Lab.	French.	Latin.	Biol. Lab.	[illegible]	
3	Biol. Lab.	Chem. Lab.	Biology.	Biol. Lab.	French	
4	Biology.	Chem. Lab.	Logic.	Greek.	Greek.	
5		German.				

(*b*) During Second Term.

Primary Courses (Third and Fourth Years).

		Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
	9	Geology. Sanskrit. Hist. of Philos. Mechanics. German.	Chem. History. Greek.	Geology. Sanskrit. Astr. (*a*) Opt. (*b*) Hist. of Philos German.	Latin. Hebrew.	Zoology.	Chem. Lab. Geol. Lab.
	10	Botany. English. Mathematics Physics (*B*).	Eng. Comp. III.	Latin. Hebrew.	Botany. English. Math. Physics (*B*)	Geology. Sanskrit. Hist. of Phil. Ast. (*a*) Opt. (*b*) German.	Chem. Lab. Geol. Lab.
	11	Chemistry. History. Greek.	Latin. Hebrew.	History. Greek.	Chemistry. History. Greek.	Latin. Hebrew.	Chem. Lab. Geol. Lab.
	12	Moral Philos. French. Economics.	Physics (A) Moral Philos. French. Economics.	Eng. Comp. IV.	Physics (*A*) Moral Philos. French. Economics.	Moral Philos. French. Economics.	Geol. Lab.
	2	Zool. Lab. Comp. Phil. Chem. Lab. Polit. Science Physics Lab.	Pedagogy. Hist. of Phil.: Sanskrit. Mechanics. German.	Zoology. Polit. Science.	Zool. Lab. Physics Lab. Comp. Phil. Pol. Science.	Pedagogy Bot. Lab. Polit. Science.	
	3	Zool. Lab. Chem. Lab. Physics Lab.	English. Bot. Lab. Mathematics	Chem. Lab.	Zool. Lab. Physics Lab.	Bot. Lab. English. Mathematics	
	4	Art & Arch. Logic & Met. Roman Law. Chem. Lab.	Bot. Lab. Logic & Met. Roman Law.	Roman Law. Bot. Lab. Chem. Lab.	Art & Arch. Logic & Meta. Roman Law.	Logic & Met Rom Law (*b*) Cons. Law (*a*)	
	5	Pub. Finance. Const. L. & H.	Const. L. & H.	Bot. Lab. Chem. Lab.	Public Finance. Const. L. & H.	Const. L. & H.	

(*A*) Heat, Light and Sound.

(*B*) Magnetism and Electricity.

(*a*) During First Term. (*b*) During Second Term.

N.B.—The term Primary Course denotes the first course taken in the subject subsequent to the Intermediate Examination, whether in the Third or Fourth Year.

DATE.	Hour.	Supp. to First Year Sessional.	Second Year Exhibitions.	Supplemental to Intermediate.	Scholarships (Third Year).	Supp. to Third Year Sessional.
Wednesday... 9	9	Latin Books.	Latin Books and Sight Translation.	Latin Books.	Latin Books, Math. (Anal. Geom. (1).)	Latin Books.
	2 30	Latin Composition Sight Translation and History.	Latin Composition, Grammar and History.	Latin Composition, Sight Translation, History and Literature.	Latin Composition and Sight Translation.	Latin Composition, Sight Translation, History and Literature.
Thursday.....10	9	Mathematics.	Mathematics, (Eucl., Alg., Trig.)	Mathematics.	Math. (Anal. Geom. (2)) ; Anc. History ; Chem.	Mathematics.
	2.30	Mathematics.	Mathematics, (Geometry.)	Mathematics.		
Friday.....11	9	English Literature. History and Composition	English Literature (Spenser & Tennyson) & Composition.	English Language, Literature and Composition. Logic.	English Literature (Shakespere and Milton), Logic.	English.
	2.30			Biology.	English Literature (Charles Lamb) and Composition; Chem.	
Monday.....14	9	French.	French.	French.	Math. (Calculus) ; French; Chemistry; Econ. Theory.	French : Botany.
	2.30	German.	German.	German.	German ; Econ. Theory.	German.
Tuesday.....15	9	Physics.	Mathematics, (The. of Eq., Alg.)	Mathematics.	Polit. Sci.; Math., (Higher Alg., Trig.)	Mathematics.
	2.30		Modern History and English Language (Trench).	Chemistry.	Modern History ; Chemistry ; Eng. Const.	
Wednesday..16	9	Greek Books.	Greek Books and Sight Translation.	Greek Books.	Greek Books ; Hist. of Econ.	Greek Books.
	2.30	Greek Composition, Sight Translation and History.	Greek Composition, Grammar and History.	Greek Composition, Sight Translation, History and Literature.	Greek Composition and Sight Translation.	Greek Composition, Sight Translation, History and Literature.

For Matriculation Examination dates see page .

Christmas Examinations, 1903.*

Morning examinations commence at 9; afternoon examinations at 2.30.

Day and Date.	First Year.	Second Year.	Third and Fourth Years.
Monday, Dec. 14th....A.M.	Latin.	Latin.	Mechanics; Astronomy.
" P.M.		Mathematics.	German.
Tuesday, Dec. 15th.....A.M.	Greek.	Greek.	Greek; Political Economy.
" P.M.		Chemistry.	Geology.
Wednesday, Dec. 16th..A.M.	Physics.	Psychology.	Moral Philosophy.
" P.M.	French.	French.	Latin.
Thursday, Dec. 17th ...A.M.	Mathematics.	English.	Botany; Political Science.
" P.M.	German.	German.	French.
		Hebrew.	History of Philosophy.
Friday, Dec. 18th.....A.M.	English.	Physics.	Logic.
" P.M.		Biology.	Zoology.

* The Christmas Examinations are obligatory on all undergraduates, and on partials desiring to be undergraduates, and the standing gained therein will be taken into account by the Faculty at the close of the session. The results will be made known after the Christmas vacation.

The above time table is subject to modification, especially in regard to the Third and Fourth Years.

Sessional Examinations, 1904.

Morning examinations commence at 9; afternoon examinations at 2.30.

Day and Date.	First Year.	Second Year.	Third and Fourth Years.
Thursday, April 7th...A.M.	Latin.	Latin.	
" P.M.	Latin.	Latin.	
Friday, April 8th.....A.M.	English.	English.	
" P.M.	English.	English.	
Monday, April 11th....A.M.	German	German.	Order of subjects to be determined in the course of the session.
" P.M.	German.	German.	
Tuesday, April 12th....A.M.	Geom. & Arith.	Mathematics.	
" P.M.	Trig. & Alg.	Mathematics.	
Wednesday, April 13th.A.M.		Chemistry.	
" P.M.		Chemistry.	
Thursday, April 14th. A.M.	Greek.	Greek.	
" P.M.	Greek.	Greek.	
Friday, April 15th. .. A M.	French.	French.	
" P.M.	French.	French.	
Monday, April 18th.....A.M.	Physics.	Logic.	
" P.M.		Hebrew.	
Tuesday, April 19th....A.M.		Botany, Zoology	
" P.M.		Biology.	

Royal Victoria College.

The institution of the Royal Victoria College, in September, 1899, was a direct continuation of the work begun in 1883, during the Principalship of the late Sir William Dawson, when Lord Strathcona and Mount Royal placed a sum at the disposal of the University of McGill, for the Endowment of a College and classes for women. For many years previously it had been hoped by those interested in the education of women in Montreal that the University would extend its benefits to women, but the means necessary for carrying out such an aim had not been available. The classes were organized in 1884 as a Special Course in the Faculty of Arts, held at McGill College, separate in the main from those for men, but under identical conditions. In some of the work of the Third and Fourth Years, and in the Honour and Additional Courses, the classes were held jointly.

The ultimate aim of Lord Strathcona had been the foundation of a place of residence, and, with this object, he announced his intention of building and endowing the Royal Victoria College. By the opening of this Institution the opportunity of residence and college life is given to women-students of McGill University, working in accordance with the system previously organized in the Special Course in Arts, but under greatly improved conditions. A share in the advantages of college life is offered also to the non-resident women-students of the University, who are henceforth also students of the Royal Victoria College. Additional elements have been added in the organization of a Musical Department, and in the institution of Resident Women Tutors. These additions are in accordance with the general aim of the College; viz., the higher education of women, and mainly to qualify them to take degrees in Arts (including Pure Science), and to provide them with instruction in those branches of a liberal education necessary thereto and in such other subjects as may from time to time be determined.



Royal Victoria College for Women.

The College being a residential College for the Women-Students of McGill University, its students, whether Undergraduates, Conditioned Students, or Partial, follow the courses in Arts and Pure Science offered by the University, (see pp. 76--125).

Lectures are given by the Professors and Lecturers of the University, either in the College or in the University buildings, and students attend the University Laboratories for practical instruction. In addition to the instruction given in lectures and laboratory practice, the students of the Royal Victoria College are assisted in their studies by the Resident Tutors.

The College Building.

The College is situated on Sherbrooke Street, at the head of Union Avenue, in close proximity to the University buildings and to the slopes of Mount Royal. The building is fireproof, and much thought and artistic care have been given to the furnishing and decoration.

On the ground floor are the offices of the Administration, including the rooms of the Warden and Secretary, the Professors' common room, lecture rooms (English, French, German, Mathematics), students' common room and a spacious dining hall. On the first floor are other lecture rooms (Latin, Greek, Logic, and Philosophy), the library, reading-room, and a handsome assembly hall. On the second and third floors are the rooms of the resident students. These are of varying size and plan. Each student has a separate bedroom, and, as a rule, one sitting-room is shared by the occupants of the two or three bedrooms immediately adjoining. The entire use of a sitting-room can be obtained, and there are some rooms which may be used as study-bedrooms. The rooms are completely furnished, and no article of furniture need be brought by the students. No part need be taken by the students in the care of their rooms.

In addition to the lawn at the back of the College, the students are entitled to use, subject to regulations, the grounds of McGill University, with its tennis-courts, skating-rink, etc.

A nucleus of the College Library has been formed in a set of books, comprising the stated books and others referred to in connection with the University curricula, the modern language course being especially well represented. There are

also works of general literature. The Library is a reading-room, and the books are not taken away. The students have access also to the University Lending Library.

Students of Music have the use of a large practising-room, and, at certain hours, of the piano in the common room, as also of the Gymnasium piano.

The Gymnasium, fully equipped in accordance with the requirements of the Swedish system, is in the basement. In connection with the Gymnasium there are bath-rooms and dressing-rooms.

The health of the students is under the charge of a competent physician practising in Montreal, who may be consulted free of charge.

Students of the Royal Victoria College, as students of McGill University, are entitled to the use of the University Library, containing about 96,500 volumes, and the Peter Redpath Museum containing large collections in Mineralogy, Palæontology, Zoology, Botany, Archæology, and Ethnology, and to work in the Physical, Chemical, Zoological, Botanical and other laboratories and the Botanic Gardens of the University. (For particulars of laboratories, etc., see pp. 125, *et seqq*).

Board and Residence.

Residence in the College buildings is open to Undergraduates, Conditioned Students, or Partial Students, but the last are not received in residence unless they take courses of study approved by the Faculty of the College. The expense of board and residence ranges from $290 to $440, in addition to the sessional fees for tuition (see p. 29), according to the room or rooms occupied by the students; for a majority of the rooms the expense of board and residence is $290. These charges cover the University Session, 9th September—30th April, and the summer classes, 30th April—26th June. A deduction of $50 is made in the case of students who go out of residence at the end of the University Session.

Applications for admission or further particulars should be addressed to the Warden, Royal Victoria College, Montreal.

Physical Training.

The Gymnasium is in the charge of Miss Holmstrôm, graduate of the Posse Gymnasium, Boston, and of the Harvard Summer School, who teaches on Swedish principles. Special attention

is devoted to the application of exercise in cases of physical weakness, Miss Holmström having had considerable experience in the medical branch of her work. All students undergo a physical examination on entering upon the gymnastic course, under the superintendence of Dr. R. Tait Mackenzie, B.A., M.D., Assistant Lecturer in Anatomy at the University. Teams of Basket-Ball are formed, and, when weather permits, this and other exercises are practised on the lawn, at the back of the College building. This ground is also provided with lawn-tennis courts.

Exhibitions and Scholarships.

For a statement of the Exhibitions and Scholarships open to Women Students of the University, see pp. 47, 53 and 55.

In addition to these, and further to encourage residence within the College walls of students who might otherwise arrange to board in the city, the Warden and Faculty are empowered to make nominations in any of the four College years to not more than three additional Exhibitions of the value of $100 each.

Music.

Apart from the University Courses, instruction in Music is offered at the College, for which a separate fee is charged. The instruction includes the Pianoforte in all its branches (solo, ensemble playing, concertos, duos for two pianofortes); Singing (voice production, vocalization, sight-singing, ear-tests, solo and part singing); and Lectures on Theory (elements of music, harmony, counterpoint, and history of music). Attendance at certain of these Courses is expected of all students of music.

ROYAL VICTORIA COLLEGE.

First Year.

Hours	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Greek.	Physics.	Greek.	Greek.	Greek.	
10	English.	History.	French.	French.	Math.	
11	German.	Math.	Latin	English.	French.	
12	Latin.	Latin.	Math.	German.	Latin.	
2	Math.	French.	German.	Physics.	English.	
3			Eng. Comp.		German.	
4						
5						

Second Year.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Greek.	Latin.	French.	Latin.	Math.	Chem. Lab.
10	English.	Math.	Math.	French.	Latin.	Chem. Lab.
11	Logic.	Chemistry.	German.	English.	German.	
12	German.	Greek.	Chemistry.	Logic.	Chemistry.	
2	Biol. Lab.	French.	Latin.	Biol. Lab.	English.	
3	Biol. Lab.	Chem. Lab.	Biology.	Biol. Lab.	French.	
4	Biology.	Chem. Lab.	Logic	Greek.	Greek	
5		German.				

(*b*) During second term.



Macdonald Engineering Building.

Faculty of Applied Science.

FIELD WORK IN SURVEYING WILL BEGIN ON MONDAY, AUGUST 24TH. LECTURES WILL BEGIN ON TUESDAY, SEPTEMBER 22ND.

§ 1. General Statement.

The instruction in this Faculty is designed to afford a complete preliminary training, of a practical as well as theoretical nature, in the following:—

I.—ARCHITECTURE.
II.—CHEMISTRY.
III.—CIVIL ENGINEERING AND SURVEYING.
IV.—ELECTRICAL ENGINEERING.
V.—MECHANICAL ENGINEERING.
VI.—METALLURGY.
VII.—MINING ENGINEERING.

The degrees conferred by the University upon such undergraduates of the Faculty as fulfil the conditions and pass the examinations hereinafter stated are, in the first instance, "Bachelor of Science" (B.Sc.), mention being made in the diploma of the particular Course of study pursued, and, subsequently, the degrees of "Master of Science" (M.Sc.), and "Doctor of Science" (D.Sc.).

The curriculum, as laid down in the following pages, may be changed from time to time as may be deemed advisable by the Faculty, and it is now under contemplation to make important modifications in the several courses. Should the proposed changes be carried out, the work of the first two years will be the same for the civil, electrical, mechanical and mining courses.

§ II. Matriculation and Admission.

For subjects of matriculation, conditions and fees, see pp. 10–20.

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§ III. Examinations and Degrees.

I. For the Degree of Bachelor of Science (B.Sc).

Sessional examinations are held in all the subjects. In addition, there are Christmas examinations in certain of the subjects, and class examinations are held from time to time.

II. Higher Degrees.

For regulations relating to the degrees of "Master of Science" (M.Sc.), and "Doctor of Science" (D.Sc.), see pp. 24 and 25.

III. Special Provisions for Obtaining the two Degrees of "Bachelor of Arts (B.A.) and Bachelor of Science (B.Sc.) in Six Years.

For particulars, see p. 68.

§ IV. Graduate Courses.

Students who take the Bachelor's degree in one of the courses provided by the Faculty of Applied Science may graduate in any of the remaining courses by attending one or more subsequent sessions.

Graduates may also take an advanced course in the branch in which they have received their degree. On passing an examination at the end of such advanced course, the Master's degree will be conferred without further examination, on presentation at the end of one additional year, of a satisfactory thesis on approved work.

Students are strongly recommended to take a graduate course, and special arrangements will be made for advanced and research work in the following:—

Architecture.—Advanced study in design. Students may also take any of the options of the course (see p. 160), and the course on Art History (see p. 104).

The elasticity and strength of materials. (See § XI, 3, and § XII, 13.

Mining and Metallurgy.—Advanced study in metallurgy and mining can be carried on with great advantage in the laboratories. (See § XI, 11, 14, and § XII, 9 and 10.)

The efficiency of pumps and hydraulic motors. (See § XI, 3, and § XII, 7.)

Ore dressing, coal washing, and gold and silver milling. The laboratories of the Mining department have been equipped and arranged with especial reference to advanced and research work in the theory and practice of concentration. (See p. 199.)

The efficiency of power transmission by air, water, gas, and steam. (See § XI, 3, 5, 10.)

The efficiency of steam, gas and hot-air engines and of air compressors. (See § XI, 10 and 17.)

The efficiency of machines and machine tools, and the power absorbed by the several processes of mechanical work. (See § XI, 10.)

The efficiency of dynamometers, belting and shafting, including investigations into the relative merits of the several unguents. (See § XII, 8.)

The efficiency of the several types of boilers, including investigations on the heat-producing power of fuels. (See § XI, 17.)

The flow of water through orifices and pipes, and over weirs. (See § XI, 3, and § XII, 7.)

Geodesy and practical astronomy. (See § XII, 6.)

Physics.—The Macdonald Physics Building has been equipped and arranged with special reference to graduate courses and original research work in various branches of pure Physics. Every facility will be afforded in the workshops for the construction of special apparatus required for such investigations. (See § XII, 12.)

Mathematics.—Students taking graduate courses will receive guidance in any advanced mathematics required in connection with their work.

Chemistry and Mineralogy. (See § XI, 2, 8 and 13, and § XII, 4.)

The determination and comparison of the errors and the coefficients of standards of length. (See § XI, 4, and § XII, 6.)

The determination of gravity. (See § XII, 6.).

§ V. Attendance and Conduct.

See page 35.

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§ VI. Library.

Students in this Faculty are entitled to use the University Library under the regulations cited on p. 296. Students also have access to the various departmental libraries under the special regulations by which each is governed.

§ VII. Fees and Registration,

See pp. 27 and 30.

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§ VIII. Medals, Exhibitions, Prizes and Honours.

1. The British Association Medals and Exhibition, founded by the British Association for the Advancement of Science, in commemoration of the meeting held in Montreal in the year 1884.

A British Asociation medal and prize in books are open for competition to students of the graduating class in each of the seven courses, and, if the examiners so recommend, will be awarded to the student taking the highest position in the final examinations.

2. The Governor General's silver medal (the gift of His Excellency The Right Honourable the Earl of Minto).

This medal will be awarded for graduate research work.

3. Summer Work. (See § IX, 1.) The following prizes are offered for the best summer theses:—

To the students of the Civil Engineering Course, a prize of $25 presented by E. B. Greenshields, Esq., B.A.

To the students of the Electrical Engineering Course, a prize of $25 from the British Association fund.

To the students of the Mechanical Engineering Course, a prize of $25 presented by the Crosby Steam Gauge & Valve Co.

To the students of the Mining Engineering Course, a prize of $25 presented by Geo. E. Drummond, Esq.

Four prizes, each of the value of $25, are offered for competition to student members of the Canadian Society of Civil Engineers, for the best papers on subjects in any department of engineering. The summer theses prepared by students of this University are available for this competition.

4. A gold medal and two prizes of $35 and $15, offered by the Canadian Mining Institute, will be open for competition to students from McGill University, Toronto University and Queen's University, and will be awarded to the students presenting the best papers on some subject connected with mining, ore dresing, metallurgy, or economic geology. Preference will be given to those theses which show decided originality.

5. The following Exhibitions and Prizes will be open for competition at the beginning of the session:—(*Students are required to notify the Dean of their intention to compete, at least one week before the commencement of the Examination.*)

(A) A British Association Exhibition of $50.00 and prize of $25,00, to students entering the fourth year, the subjects of examination being the Mathematics and Theory of Structures of the ordinary course.

(B) Three prizes of $25.00, $15.00 and $10.00, to students entering the third year, the subject of examination being the Mathematics of the second year.

(C) A Scott Exhibition of $50.00, founded by the Caledonian Society of Montreal, in commemoration of the Centenary of Sir Walter Scott, and two prizes of $25.00 and $15.00, to students entering the second year, the subjects of examination being:—

(*a*) English Literature (Summer Vacation Work); (*b*) (Mathematics of the first year; (*c*) Descriptive Geometry of the first year.

(D) Two prizes, each of $10.00, presented by J. M. McCarthy, Esq., B.A.Sc., to students entering the third year, for proficiency in Levelling or Transit Work.

6. The sum of $150, presented by W. A. Carlyle, Esq., Ma.E., may be awarded in prizes to students of the Mining Course taking the highest positions in the degree examinations of 1904.

7. A prize of $50.00, presented by James Tighe, B.A.Sc., for research work in Hydraulics.

8. An exhibition offered to graduates by A. E. Childs, M.Sc., for a special research on "The flow of gas through pipes under pressure."

9. It is proposed to offer in September, 1904, a Research Scholarship in Chemistry, on the endowment of the late Dr. T. Sterry Hunt, to graduate students in this Faculty or the Faculty of Arts.

10. The Canadian General Electric Company, through Mr. F. Nicholls, of Toronto, has decided to present annually to the Faculty four scholarships, each in the form of a three months' course at the Company's works at Peterboro or Montreal, with the addition of the sum of $100.00.

11. The Allis-Chalmers Company of Chicago has decided to present annually to the Faculty a scholarship in the form of a three or four months' course at the Company's works at Chicago, with the addition of a sum of $150.00.

12. Two scholarships, of the value of $75, are offered by Mr. Andrew T. Taylor, F.R.I.B.A., for students entering the second year of the course; the first of these will be awarded in September, 1903; the second in September, 1904. The scholarships are restricted to students taking the full curriculum and proceeding to the degree of B.Sc. in Architecture. Candidates must have passed in all subjects of the first year (or have passed equivalent examinations, accepted by the Faculty, elsewhere).

13. The Province of Quebec Association of Architects propose to offer a scholarship covering the fees of a full course in Architecture, to be open for competition to students from the Province of Quebec. Particulars may be obtained from the Assistant Secretary of the Association, 112 Mansfield Street, Montreal.

14. Prizes or Certificates of Merit are given to such students as take the highest place in the sessional and degree examinations.

15. Honours.—On graduation, Honours will be awarded for advanced work in professional subjects.

16. Science Scholarships granted by the Royal Commission for the Exhibition of 1851.—The Scholarships of £150 sterling a year are tenable for two or, in rare instances, three years. They are limited, according to the Report of the Commission, "to those branches of Science such as Physics, Me-

chanics and Chemistry, the extension of which is specially important for our national industries." Their object is not to facilitate ordinary collegiate studies, but "to enable students to continue the prosecution of Science with the view of aiding in its advance or in its application to the industries of the country."

It is open to students of not less than three years' standing in the Faculties of Arts or Applied Science, and is tenable at any university or at any other institution approved by the Commission.

A nomination to one of these scholarships for the year 1903 was placed by the Commission at the disposal of McGill University, and another may be granted in 1905.

This Exhibition has been awarded as follows:—

Evans, P.N., 1891; Macphail, J. A., 1893; King, R. O. 1895; Gill, J. L. W., 1897; McLean, W. B., 1899; McClung, R. K., 1901; Cooke, H. Lester, 1903.

17. Workshop Prizes.—A prize of $20.00, presented by C. J. Fleet, Esq., B.A., B.C.L., for bench and lathe work in the woodworking department, open to students of not more than two terms' standing in workshop practice.

§ IX. Special Provisions.

1. Summer Work.—During the summer vacation following the close of each year, all students entering the third and fourth years are required to prepare a thesis on a subject specified by the Faculty. Any student may substitute for the specified subject a report on some practical work in course of construction. The marks given for these theses will be added to the results of the sessional examinations. The theses must be handed in to the Dean on or before October 1st.

2. All students in the Civil and Mining Engineering Courses, entering the second and third years, students in the Civil Engineering Course entering the fourth year, and students in the Architectural Course entering the third and fourth years, are required to be in attendance at the Surveying School on the 24th August, when the Field-work in Surveying and Geodesy will commence. (See § XI, 16.)

3. All students in the Mining and Metallurgical Courses are required to attend the Summer School in Mining, held between

the third and fourth years (four to six weeks of field-work). The school is held in May and June. (See § XI, 14.)

4. Partial Students may be admitted to the professional classes upon payment of special fees. (See p. 30.)

5. Students in Applied Science may, by permission of the Faculty, take the Honour Courses in the Faculty of Arts.

6. Undergraduates in Arts of the second and third years, or graduates of any university, entering the Faculty of Applied Science, may, at the discretion of the professors, be exempted from such lectures in that Faculty as they have previously attended as students in Arts.

7. Students who have failed in an examination may regain their standing by passing a supplemental examination at a time appointed by the Faculty. Unless such supplemental examination is passed, students will not be allowed to proceed to any subsequent examination in the subject. A second supplemental examination will not be granted unless under exceptional circumstances, to be investigated in each case by the Faculty.

8. Students may be required to answer satisfactorily a weekly paper on such subjects of the course as the Faculty may determine.

9. Credit will be given in the sessional standing for class examinations held during the session, and for the Christmas examinations.

10. Students who fail to obtain their session, and who in consequence repeat a year, will not be exempted from examination in any of those subjects in which they may have previously passed, except by the express permission of the Faculty. Application for such exemption must be made at the commencement of the session.

11. Partial Students are not eligible for prizes.

12. Certificates may be given to students who have passed through any of the special courses attached to the curriculum.

13. The headquarters of the Canadian Society of Civil Engineers are located in Montreal. Students in all departments of engineering are strongly recommended to become student members of the Society, which they can do on payment of a fee of $2.00. They are then entitled to the two volumes of "Transactions," which are annually published, and to the use

of the Society's rooms on Dorchester Street. They also have opportunities of meeting the prominent engineers of the country and of being present at the fortnightly sessions, at which papers are read by leading members of the Society on current engineering subjects and works of construction.

During the winter there will be a special series of students' meetings, at which papers, illustrated by lantern slides, will be read by well-known engineers. Students may also compete for the prizes which are offered by the Society, (see p. 145).

14. The headquarters of the Canadian Mining Institute are in Montreal. Students in Mining and Metallurgy are strongly recommended to become members of the McGill Mining Society, which, although a student body (see p. 184), is affiliated with the Institute. Members of this Society receive the Transactions of the Institute without extra expense, and are entitled to attend all meetings and to compete for the prizes offered (see p. 145).

X. Courses of Instruction.

I. Architecture.

The Architectural Course begins in the second year, for which the first year is preparatory, especially in the departments of Mathematics and Drawing (Freehand, Lettering, and Projections).

The work of the second year is of a general character, and is planned to combine to some extent the work of the Architectural and of the Civil Engineering students.

The third and fourth years are devoted to more specialized architectural study in various branches, and a fifth or graduate year has been organized for advanced study in design. For those students who desire to devote themselves more especially to the engineering side of architecture, the course is modified to include additional mathematics in the third year, and the advanced course of Theory of Structures in the fourth year. Such students devote proportionately less time to architectural drawing and designing.

In the second year the historical course embraces a survey of architectural history from ancient Egyptian to modern times. The great eras of European civilization are successively dealt with, and the evolution of styles is traced in their constructional and ornamental forms and methods.

In the third and fourth years the lectures are arranged in continuation and extension of this general course. Renaissance and Modern Architecture are studied in the third year; while a course, covering both third and fourth years, comprises more detailed study of ecclesiastical, domestic, and public architecture, and deals with the historic evolution of architectural styles and with the problems and requirements of modern work.

Instruction in drawing is given during all four years—free-hand drawing (ornament and figure) from the cast and architectural drawing occupying much of the students' time during three years of the course. Modelling in clay is included in the third and fourth years.

Problems in architectural design form the basis of work in the architectural drawing class from the earliest available period, being at first more especially combined with the study of the Classical Orders.

A course of lectures is included upon general Art History, so as to place the architectural student in touch, not only with the decorative details of the different architectural styles, but also with contemporary forms in other branches of art, especially the decorative arts employed in building.

For the scientific side of professional study the courses in Mathematics are very fully developed in the first and second years, being continued in the third year also by those who elect to take the advanced course in Theory of Structures. Descriptive Geometry is studied, as well as elementary Shades and Shadows, and Perspective. A course in Surveying, both practical and theoretical, is also included; four weeks before the beginning of the session are devoted to Field Work in each of the two last years. A short course in Geology is given in the fourth year.

Theory of Structures and Strength of Materials form one of the chief subjects of study in the third year, the course also comprising instruction in Graphical Statics, as well as supplementary work of a practical nature in the Testing Laboratories.

A full course on Building Construction and Architectural Engineering has been organized for the third and fourth years, common to both architectural and engineering students. It includes also Sanitation, and Hygiene; Heating and Ventilation; Specifications and Professional Practice.

A special course of lectures has been arranged to be available for those who are engaged in office work during the day; it embraces the subject of Architectural Styles, their features, mouldings and ornament. This course is planned with a view to preparation for the examinations for Associateship now held in colonial centres by the Royal Institute of British Architects; it comprises a detailed study of the three great divisions of historical architecture, Classical, Mediæval and Renaissance, in accordance with the examination-programme of the Royal Institute.

The course will be repeated in session 1903-1904, if sufficient students come forward. (See p. 162.)

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

First Year.

	Hrs.		Hrs.
Descriptive Geometry	(p. 168), 4	Mathematics	(p. 175), 10
English	(p. 172), 2	Physics	(p. 185), 2
Freehand Drawing	(p. 173), 3	Physical Laboratory	(p. 186), 4½
Lettering	(p. 173), 3	Shopwork	(p. 207), 7

Second Year.

	Hrs.		Hrs.
Architecture (Elements of)	(p. 161), 1	Mathematics	(p. 175), 6
Architecture (History)	(p. 160), 2	Physics	(p. 185), 2
Chemistry	(p. 163), 3	Chemical Lab.	(p. 163), 3
Descriptive Geometry	(p. 168), 3	Physical Lab.	(p. 186), 3
Drawing and Design	(p. 161), 7	Shopwork	(p. 207), 3
Freehand Drawing	(p. 173), 4		

Third Year.

	Hrs.		Hrs
Architecture	(p. 160), 1	Mathematics	(p. 175), 2 (opt.)
Architecture (History)	(p. 160), 2	Modelling	(p. 161), 3 (b)
Art History	(p. 161), 1	Municipal Engineering	(p. 168), 1 (opt.)
Descriptive Geometry	(p. 169), 3 (a)	Structural Engineering	(p. 162), 2
Designing or Drawing.	(p. 161), 10	Surveying	(p. 188), 3
Freehand Drawing	(p. 173), 5 (a), 7 (b)	Theory of Structures	(p. 165), 3
Graphical Statics	(p. 165), 2 (a)	Testing Laboratory	(p. 166), 3
Mapping	(p. 188), 3		

FOURTH YEAR.

	Hrs.		Hrs.
Architecture ..... (p. 161),	2	Municipal Engineering (p. 168),	1 (opt.)
Art History .... (p. 161),	1	Structural Engineering (p. 162),	2
Designing ..... (p. 161),	20	Theory of Structures.. (p. 165),	4 (opt.)
Freehand Drawing and Water Colouring (p. 161)	6 (a), 9 (b)	Testing Laboratory.... (p. 166),	4 (opt.)
Geology..... (p. '73),	3 (a)		
Graphical Statics... (p. 165),	3 (opt.)		
Modelling..... (p. 161),	3 (b)		

II. Chemistry.

The course in Chemistry is arranged to give the student in the first two years a thorough knowledge of the fundamental principles of Chemistry and Physics, with sufficient Mathematics to enable him to understand the theoretical parts of these subjects.

In the two subsequent years Chemistry, analytical, organic, and physical, is taught both in its purely scientific aspects and in its relations to all kinds of commercial work. Special facilities are afforded for the prosecution of post-graduate research work in all the branches of Chemistry.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

FIRST YEAR.

	Hrs.		Hrs.
Descriptive Geometry.. (p. 168),	4	Mathematics..... (p. 175),	10
English... ..... (p. 172),	2	Physics..... (p. 185),	2
Freehand Drawing..... (p. 173),	3	Physical Laboratory.. (p. 186),	4½
Lettering ..... (p. 173),	3	Shopwork..... (p. 207),	7

SECOND YEAR.

	Hrs.		Hrs.
Chemistry..... (p. 163),	3	Chemical Laboratory... (p. 163),	17
Mathematics..... (p. 175),	6	Physical Laboratory..... (p. 186),	3
Physics..... (p. 185),	2		

THIRD YEAR.

	Hrs.		Hrs.
Chemistry ... .(p. 164),	3	Mineralogy ..... .(p. 181),	2
Determinative Mineralogy (p. 181),	3	Ore-Dressing .....(p. 181),	1
Geology..... (p. 173),	3	Chemical Laboratory...(p. 164),	18
Metallurgy..... (p. 178),	1		

FOURTH YEAR.

	Hrs.		Hrs.
Chemistry..... ...(p. 164),	4	Chemical Laboratory....(p. 164),	29
Mineralogy.....(p. 181),	2 (a)		

III. Civil Engineering.

The courses of study in Civil Engineering are designed to give to the student a sound theoretical and practical training in the sciences and principles which underlie the profession of a civil engineer. It is scarcely possible for any one person to become proficient in all branches of civil engineering, so wide is its scope and so inclusive is its purpose. As generally defined it is the "art of economically directing the great sources of power in nature to the use and convenience of man," by the construction of roads, railways, bridges, aqueducts, viaducts, canals, docks, harbours, breakwaters, light-houses, by the construction and adaptation of machinery, by the lighting and draining of cities and towns, and by the exploitation of mines. All these works are more or less governed by the same principles, and in these principles the student is carefully instructed, and by means of numerous problems occurring in every day practice, he is taught to apply his knowledge to the actual conditions of life.

During the session arrangements are made for the delivery, by distinguished engineers, of special lectures or short courses of lectures on actual works of construction.

Provision is made, by means of advanced classes, for graduates and special students to continue their studies and to engage in researches with a view to the solving of some of the numberless problems which confront the engineer in every direction. Much valuable work of this character has been already accomplished, and especial reference may be made to the fact that for several years graduates of other universities—some holding scholarships under the Royal Commissioners for the Exhibition of 1851—have carried out investigations in the several laboratories.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

FIRST YEAR.

	Hrs.		Hrs.
Descriptive Geometry..(p. 168),	4	Mathematics.....(p. 175),	10
English .. ..(p. 172),	2	Physics ....(p. 185),	2
Freehand Drawing.....(p. 173),	3	Physical Laboratory..(p. 186),	4½
Lettering .....(p. 173),	3	Shopwork .... (p. 207),	7

SECOND YEAR.

	Hrs.		Hrs.
Building Construction	(p. 162), 1	Physics	(p. 185), 2
Chemistry	(p 163), 3	Surveying	(p. 188), 3
Descriptive Geometry	(p. 168), 3	Chemical Laboratory	(p. 163), 3
Mapping	(p. 188), 6	Physical Laboratory	(p. 186), 3
Mathematics	(p. 175), 6	Shopwork	(p. 207), 4

THIRD YEAR.

	Hrs.		Hrs.
Descriptive Geometry	(p. 169), 4	Railway Structures	(p. 191), 3 (b)
Geology	(p. 173), 3	Roads and Canals	(p. 190), 2
Graphical Statics.	(p. 165), 2 (a), 3 (b)	Structural Engineering	(p. 162), 2
Mapping	(p. 188), 6	Surveying	(p. 188), 2
Mathematics	(p. 175), 2	Theory of Structures	(p. 165), 3
Mechanical Drawing.	(p. 177), 3 (opt.)	Thermodynamics	(p. 191), 1
Municipal Engineering	(p. 168), 1	Testing Laboratory	(p. 166), 3
Museum Work in Geology	(p. 173), 1 (b)	Thermodynamic Lab.	(p. 191), 2 (b)

FOURTH YEAR.

	Hrs.		Hrs.
Designing	(p. 161), 6	Railway Engineering	(p. 191), 2
Geodesy	(p. 188), 2	Structural Engineering	(p. 162), 2
Graphical Statics	(p. 165), 3	Theory of Structures	(p. 165), 4
Hydraulics	(p. 167), 2	Geodetic Laboratory	(p. 189), 4
Mechanical Engineering	(p. 176), 2 (a)	Hydraulic Laboratory	(p. 167), 3 (a)
Municipal Engineering	(p. 168), 1	Testing Laboratory	(p. 166), 6

IV. Electrical Engineering.

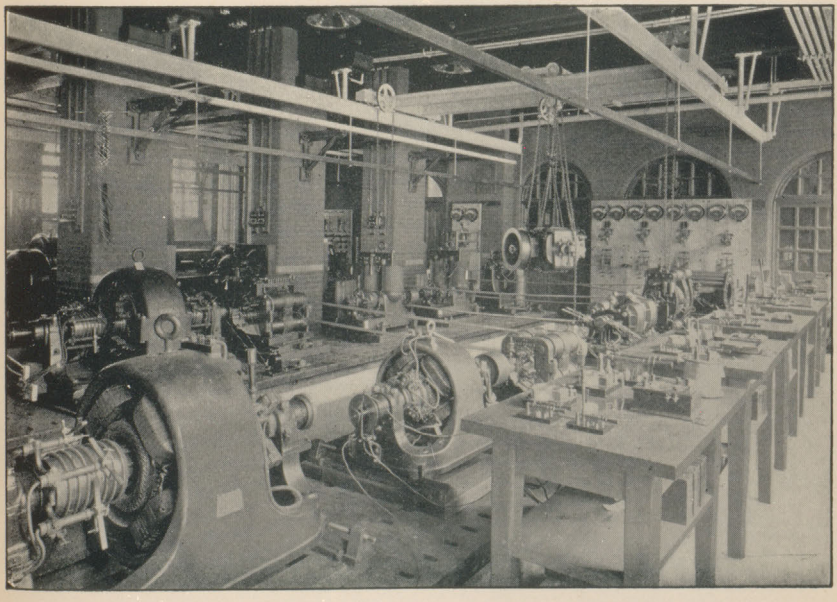
The first and second years of the undergraduate course of instruction in Electrical Engineering, are devoted, mainly, to a preparation in Mathematics, Physics, Chemistry, Mechanics, Drawing, Shopwork and work in the physical and chemical Laboratories.

The electrical studies of the third year embrace a consideration of continuous current flow, in circuits of different kinds, the principles of electro-magnetism, electrical measurements and the design and action of commutating machinery.

The fourth year is devoted principally to electrical work, and includes lectures and recitations on variable and alternating current phenomena, the principles of action and the design of alternating current machinery, electric lighting and systems of power distribution, central station design and oper-



An Electrical Engineering Research Laboratory.



Direct Current Dynamo Laboratory.

ations, urban and inter-urban railways and long distance power transmission.

In the second term of the fourth year a choice may be made between electro-chemistry and hydraulics. Each fourth year student is required to present a thesis giving the results of a suitable experimental investigation.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

First Year.

	Hrs.		Hrs.
Descriptive Geometry	(p. 168), 4	Mathematics	(p. 175), 10
English	(p. 172), 2	Physics	(p. 185), 2
Freehand Drawing, Machine Sketching and Lettering	(p. 173), 6	Physical Laboratory	(p. 186), 4½
		Shopwork	(p. 207), 7

Second Year.

	Hrs.		Hrs.
Chemistry	(p. 163), 3	Physics	(p. 185), 3
Descriptive Geometry	(p. 168), 3	Chemical Laboratory	(p. 163), 6
Kinematics of Machines	(p. 176), 3	Physical Laboratory	(p. 186), 6
Mathematics	(p. 175), 6	Shopwork	(p. 207), 6
Mechanical Drawing	(p. 177), 3		

Third Year.

	Hrs.		Hrs.
Chemistry	(p. 164), 1	Physics	(p. 185), 2
Continous Currents and Commutating Machinery	(p. 169), 2	Theory of Structures	(p. 165), 3
Machine Design	(p. 177), 1	Chemical Laboratory	(p. 164), 3
Mathematics	(p. 175), 2	Elect. Eng. Laboratory	(p. 170), 6
Mechanical Drawing	(p. 177), 3	Physical Laboratory	(p. 186), 6
		Civ. Eng. Laboratory	(p. 166), 3 (b)

Fourth Year.

	Hrs.		Hrs.
Alternating currents and Alternating current machinery	(p. 169), 3	Machine Design	(p. 177), 1 (a
Electro-Chemistry	(p. 164), 1 (b)	Mechanical Engineering	(p. 177), 2 (a)
Electrical Designing	(p. 170), 4	Thermodynamics	(p. 191), 2
Electric Lighting and Power Distribution	(p. 169), 3 (a)	Civ. Eng. Laboratory	(p. 166), 3 (a)
Electric Traction	(p. 170), 3 (b)	Electro-Chemical Lab.	(p. 164), 3 (b)
Hydraulics	(p. 167), 2	Electrical Engineering Lab	(p. 170), 9
		Mech. Eng. Laboratory	(p. 178), 3

V. Mechanical Engineering.

The complete undergraduate course in Mechanical Engineering extends over four years, and provision is made for a fifth year or graduate course in advanced experimental and other work.

The first two years of the undergraduate course of instruction are largely occupied in preparation in Mathematics, Physics, Chemistry, Mechanics, Drawing, and Shopwork. During the second year one lecture and one exercise class per week are devoted to the Kinematics of Machines.

While motion without regard to force is treated in the Kinematic course, the action of external forces in producing or changing motion in the links of mechanisms is considered in the third and fourth years, under the head of Dynamics of Machines. Two lectures per week are given in this subject in each year, and exercise classes are held for the purpose of working the problems necessary for illustration.

The work in Machine Design is carried on during the third and fourth years in conjunction with the practical instruction in mechanical designing and drawing in the Drawing Rooms.

A course of two lectures per week is given during the fourth year on Mechanical Engineering as applied to questions connected with Power Installations and Prime Movers. A large portion of the work of this course is supplmentary to, and follows, the instruction given in Thermodynamics and Machine Design, which extends over the third and fourth years. (See p. 191).

Instruction in Workshop Practice (see p. 208) is given in each of the four years. It is of a systematic nature, and is intended to prepare for, but by no means to replace, that practical experience of workshop operations on a commercial basis which every mechanical engineer must obtain for himself.

The work of the lecture rooms is illustrated throughout the course by experimental work carried out by the student, and by demonstrations in the laboratories of the department.

Arrangements are made for occasional visits to power plants and manufactories of importance.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

	Hrs.		Hrs.
Descriptive Geometry	(p. 168), 4	Mathematics	(p. 175), 10
English	(p. 172), 2	Physics	(p. 185), 2
Freehand Drawing	(p. 173), 3	Physical Laboratory	(p. 186), 4½
Lettering	(p. 173), 3	Shopwork	(p. 207), 7

SECOND YEAR.

	Hrs.		Hrs.
Chemistry	(p. 163), 3	Physics	(p. 185), 2
Descriptive Geometry	(p. 168), 3	Chemical Laboratory	(p. 163), 2
Kinematics of Machines	(p. 176), 3	Physical Laboratory	(p. 186), 3
Mathematics	(p 175), 6	Shopwork	(p. 207), 7
Mechanical Drawing	(p. 177), 6		

THIRD YEAR.

	Hrs.		Hrs.
Dynamics of Machines	(p. 176), 2	Thermodynamics	(p. 191), 2
Continuous Currents and Commutating Machinery	(p. 169), 2	Theory of Structures	(p. 165), 3
		Elect. Eng. Laboratory	(p. 170), 3
Graphical Statics	(p. 165), 2 (a)	Testing Laboratory	(p. 166), 3
Machine Design	(p. 177), 2	Mech. Eng. Laboratory	(p. 178), 3
Mathematics	(p. 175), 2	Shopwork	(p. 207), 6
Mechanical Drawing	(p. 177), 6	Physical Laboratory	(p. 186), 3

FOURTH YEAR.

	Hrs.		Hrs.
Designing	(p. 177), 6	Mechanical Engineering	(p. 177), 2
Dynamics of Machines	(p. 176), 4	Thermodynamics	(p. 191), 4
Hydraulics and Hydraulic Machinery	(p. 167), 2	Hydraulic Laboratory	(p. 167), 3 (b)
Machine Design	(p. 177), 2	Mech. Eng. Lab.	(p. 177), 12
		Shopwork	(p. 207), 4

V. Metallurgy.

The successful guidance of metallurgical industry requires, apart from considerations of business training and aptitude, an adequate knowledge of certain branches of Chemistry and Engineering as well as a familiarity with Metallurgy proper. In arranging the following course special prominence has been given to the chemical group of studies, so as to adapt it to the needs of students who intend to become metallurgical chemists. The Faculty has under consideration an alternative course in which more time will be given to Mechanical and Electrical Engineering.

In the first two years the studies are the same as in the course in Chemistry, with the addition of Mechanical Drawing and Shopwork.

In the third and fourth years thorough instruction is given in Metallurgy, Assaying, Ore-dressing, Inorganic Chemistry, Geology and Mineralogy. In the fourth year nearly two days per week are spent in the Metallurgical and Ore-dressing laboratories and drawing room.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

First Year.

	Hrs.		Hrs.
Descriptive Geometry	(p. 168), 4	Mathematics	(p. 175), 10
English	(p. 172), 2	Physics	(p. 185), 2
Freehand Drawing	(p. 173), 3	Physical Laboratory	(p. 186), 4½
Lettering	(p. 173), 3	Shopwork	(p. 207), 7

Second Year.

	Hrs.		Hrs.
Chemistry	(p. 163), 3	Mechanical Drawing	(p. 177), 3
Descriptive Geometry	(p. 168), 3	Chemical Laboratory	(p. 163), 12
Mathematics	(p. 175), 6	Physical Laboratory	(p. 186), 3
Physics	(p. 185), 2	Shopwork	(p. 207), 4

Third Year.

	Hrs.		Hrs.
Chemistry	(p. 164), 3	Ore-Dressing	(p. 181), 1
Geology	(p. 173), 3	Assaying Laboratory	(p. 178), 2
Geological Excursions	(p. 173), 3 (c)	Chemical Laboratory	(p. 164), 11
Geological Museum	(p. 173), 1½	Determinative Mineralogy	(p. 181), 3
Mechanical Drawing	(p. 177), 3	Ore-Dressing Lab.	(p. 179), 1
Metallurgy	(p. 178), 2	Testing Lab.	(p. 166), 2¼
Mineralogy	(p. 181), 2		

Fourth Year.

	Hrs.		Hrs.
Chemistry	(p. 164), 2	Ore-Dressing and Milling	(p. 182), 1
Designing	(p. 177), 1½	Chemical Laboratory	(p. 164), 9
Geology	(p. 173), 2½	Metallurgical Laboratory	(p. 179), 7½
Mechanical Engineering	(p. 177), 1	Ore-Dressing Laboratory	(p. 179), 2½
Metallurgy	(p. 179), 5½	Petrographical Lab.	(p. 174), 1
Mineralogy	(p. 181), 1		
Mining and Metallurgical Machinery	(p. 182), 1		

VII. Mining Engineering.

I. The first two years of the undergraduate course in Mining Engineering are mainly devoted to Mathematics, Mechanics, Physics, Elementary Chemistry, etc., as it is deemed necessary that the students should master the general principles underlying all scientific work before they attack the somewhat complex and specialized subjects of the professional course.

In the third year elementary courses in both Mining and Metallurgy are given, and a thorough course in Fire Assaying, but again the chief work of the year is in Applied Mechanics, Mechanical Engineering, Geology, Mineralogy and Chemistry.

The fourth year, on the other hand, is very largely given up to special work in Mining and Metallurgy, and, in addition to the lectures and demonstrations, nearly two days per week are spent in the Mining and Metallurgical laboratories and the drawing room.

The subjects of instruction and the number of hours per week devoted to each subject are as follows:—

First Year.

	Hrs.		Hrs.
Descriptive Geometry	(p. 168), 4	Mathematics	(p. 175), 10
English	(p. 172), 2	Physics	(p. 185), 2
Freehand Drawing	(p. 173), 3	Physical Laboratory	(p. 186), 4½
Lettering	(p. 173), 3	Shopwork	(p. 207), 7

Second Year.

	Hrs.		Hrs.
Chemistry	(p. 163), 3	Surveying	(p. 188), 3
Descriptive Geometry	(p. 168), 3	Chemical Laboratory	(p. 163), 6
Mapping	(p. 188), 3	Physical Laboratory	(p. 186), 3
Mathematics	(p. 175), 6	Shopwork	(p. 207), 4
Physics	(p. 185), 2		

Third Year.

	Hrs.		Hrs.
Chemistry	(p. 164), 1 (b)	Mining	(p. 181), 1
Geological Excursions	(p. 173), 3 (c)	Ore-Dressing	(p. 181), 2 (b)
Geological Museum Work	(p. 173), 1 (a) 2 (b)	Surveying	(p. 188), 2
Geology	(p. 173), 3	Theory of Structures	(p. 165), 3
Graphical Statics	(p. 165), 2 (a)	Transportation	(p. 190), 2 (b)
Machine Design	(p. 177), 2	Chemical Laboratory	(p. 163), 3
Mapping	(p. 188), 6 (a)	Determinative Mineralogy Laboratory	(p. 181), 3
Mathematics	(p. 175), 2	Fire Assaying Laboratory	(p. 178), 4 (b)
Mechanical Drawing	(p. 177), 3	Ore-Dressing Lab	(p. 182), 2 (b)
Metallurgy	(p. 178), 2 (a)	Testing Lab.	(p. 166), 3 (d) (b)
Mineralogy	(p. 181), 2		

FOURTH YEAR.

	Hrs.		Hrs.
Chemistry	(p. 164), 2 (b) opt.	Mining Problems	(p. 182), 1 (b)
Designing	(p. 177), 3 (b)	Mining Machinery	(p. 182), 2 (a) 1 (b)
Geology and Ore Deposits,	(p. 174), 4 (b)	Mining Colloquium	(p. 182), 1
Canadian Geology	(p. 174), 1 (a)	Ore-Dressing & Milling	(p. 182), 2 (a)
Hydraulics	(p. 167), 1 (a), 1 (b) opt.	Physiography	(p. 174), 1 (b) opt.
Hydraulic Machinery	(p. 167), 1	Petrography	(p. 173), 1 (a)
Metallurgy	(p. 179), 2	Mechanical Engineering,	(p. 177), 2 (a)
" Iron and steel	(p. 179), 1 (a)	Chemical Lab	(p. 164), 9 (a), 6 (b)
" Alloys	(p. 179), 1 (b) opt.	Hydraulic Laboratory	(p. 167), 3 (a)
" Advanced	(p. 179), 1 opt.	Metallurgical Lab	(p. 179), 5 (a) 11(b)
" Electro	(p. 179), 1 (b) opt.	Ore-Dressing Lab	(p. 182), 5 (a)
Mineralogy	(p. 181), 2 (a)	Petrographical Lab	(p. 174), 3 (b)
Mining	(p. 182), 2 (a), 3 (b)		

§ XI. COURSES OF LECTURES.

N.B.—The following courses are subject to such modifications during the year as the Faculty may deem advisable.

I. Architecture.

PROFESSOR:—
LECTURER:—H. F. ARMSTRONG.

The courses of study are as follows:—

1. General Architectural History. Second Year—(First Term)—Ancient Egypt; Greece; Rome; Byzantine and Early Christian Architecture. (Second Term)—Romanesque; the Monastic Orders; Gothic; Renaissance. Wed., 11; Thurs., 11.

   Text Books:—Smith & Slater; "Architecture, Classic & Early Christian;" Smith & Poynter: "Architecture, Gothic & Renaissance" (S. Low, Marston & Co.); or Hamlin: "History of Architecture" (Longmans, Green & Co.).

   Reference Books:—Fergusson: "History of Architecture" (Murray); R. Sturgis: "European Architecture" (Macmillan).

2. Renaissance and Modern Architecture. Third Year—(First Term)—Italy; Spain. (Second Term)—France; England; Colonial; Modern. Mon., 9; Thurs., 9.

   Text Books:—Anderson: "Renaissance Architecture in Italy (Batsford); Blomfield: "Short History of Renaissance Architecture in England" (Bell).



A Room in the Architectural Department.

Reference Books:—Fergusson: "History of Modern Architecture" (Murray); Gotch: "Early Renaissance Architecture in England" (Batsford); Blomfield: "Renaissance Architecture in England" (Bell).

3. Domestic, Public, and Ecclesiastical Architecture. Third and Fourth Years together. Historical Survey; modern conditions and requirements. Mon., 12.

Reference Books:—Statham: "Modern Architecture" (Chapman & Hall); Stevenson: "House Architecture" (Macmillan).

4. Elements of Architecture. Second Year. The classical Orders; arcading, mouldings, etc., classical and gothic; composition; elements of architectural effect; style. Tues., 12.

Reference Books:—Baldwin Brown: "The Fine Arts" (Murray; Scribner); Statham: "Architecture for General Readers" (Chapman & Hall).

5. Art History. Third and Fourth Years together. Sculpture; painting; the industrial arts. Tues., 9.

Reference Books:—Baldwin Brown: "The Fine Arts" (Murray; Scribner); Upcott: "Introduction to Greek Sculpture" (Clarendon Press); Gardner: "Handbook of Greek Sculpture" (Macmillan); Woltman & Woermann: History of Painting" (Kegan Paul, & Co.); Labarte: "Histoire des Arts Industriels" (Morel).

6. Drawing and Modelling.

(*a*) Freehand drawing from the cast (ornament and figure). Second Year—4 hrs.; Third and Fourth Years—6 hrs. extra time for water color work. Mr. Armstrong.

(*b*) Architectural Drawing and Design.—
Second Year—7 hrs. Studies of the orders; rendering with the pen and brush; elementary problems in design.
Third Year.—10 hrs. Problems in Design.
Fourth Year.—20 hrs. Problems in Design.
Advanced (Graduate) Course. Problems in Design.

(*c*) Modelling. Third and Fourth Years—3 hrs. (Second Term). Architectural ornament modelled in clay from the cast. Mr. Armstrong.

Messrs. E. E. S. Mattice, B.A.Sc., (McGill), and M. C. J. Beullac, B.Sc., (Univ. of France), of the Dominion Bridge Works, give special courses of lectures on Wednesdays at 12 m., and Fridays at 2 p.m., in the following:—

1. Building materials; the history, properties, tests and uses of all materials of construction.
2. Specifications and professional practice; the different methods of preparing specifications for estimates, instructions to bidders, and rules to be observed in writing specifications, general clauses, law of contracts.
3. Building Construction:—
   (*a*) Carpentry; frames, joints, framing of floors and roofs, partitions, bridging, furring, etc.
   (*b*) Slow burning construction.
   (*c*) Masonry.
4. Hygiene:—
   (*a*) Plumbing.
   (*b*) Disposal of household refuse.
   (*c*) Heating.
   (*d*) Ventilation.
5. Steel frame buildings; design, mill-work, steel and cast iron columns and connections, beams and girders, framing and wind bracing.

Special designs will be prepared in the drawing-room illustrating the several subjects of the lectures.

R. I. B. A. Examinations.—The Royal Institute of British Architects having decided to hold in the Colonies qualifying examinations for Associateship, and Montreal having been selected as the examination-centre for the Dominion, a special course of lectures in preparation for these examinations will be given during the winter, provided a sufficient number come forward to attend it. The course will embrace the subject of Architectural Styles, their Features, Mouldings, and Ornament, comprising a study in detail of the three great divisions of historical architecture, Classic, Mediæval and Renaissance, in accordance with the programme of the Royal Institute. The lectures will be given on Tuesday and Thursday, from 5.30 to 6.30 p.m., unless other times prove more convenient to the majority of those attending. The complete course will

cover two sessions; for session 1903-04 the subject will be Classic and Mediæval Architecture. The Architectural Library will be available for reading and reference to those taking this course; it is open in the evening from 7.30 to 10.30, as well as during the day. The fee for this course is ten dollars ($10.00) per session.

ARCHITECTURAL EQUIPMENT.—The architectural equipment consists of a representative collection of casts, comprising architectural detail and ornament, as well as figure sculpture; of photographs and illustrations; an arc-light electric lantern; a large collection of slides, diagrams, and models; and a library for architectural study. (See § XIII.)

WOMEN STUDENTS.—The classes in freehand drawing, and modelling, and in architectural design, as well as the architectural lectures, are open to women students. Information as to admission may be obtained on application to the Dean of the Faculty or to the Professor of Architecture.

2. Chemistry and Assaying.

PROFESSORS:—B. J. HARRINGTON.
J. WALLACE WALKER.
ASSISTANT PROFESSOR:—N. NORTON EVANS.
DEMONSTRATORS:—D. MACKINTOSH.
BERTRAM D. STEELE.
L. O. HOWARD.
CHARLES S. PATERSON.
E. H. ARCHIBALD.
LECTURE ASSISTANT:—M. VIOLETTE DOVER.

Students in all the courses of Applied Science are expected to take up the study of Chemistry in the second year, having previously acquired a knowledge of some branches of Physics in the first year of their course. They attend a course of lectures, supplemented by tutorial classes, on the laws of chemical combination, chemical formulæ and equations, the preparation and properties of the more important elements and their compounds, etc. They must also devote at least one morning or afternoon a week throughout the session to practical work in the laboratory, where they learn the construction and use of ordinary apparatus, and perform a series of experiments designed to cultivate the powers of observation and deduction. Many of the experiments involve accurate weighing, and for this purpose the elementary laboratory is

well supplied with balances. During the second term considerable attention is also devoted to the subject of Qualitative Analysis.

The lectures in the third year comprise:—

(*a*) A course dealing mainly with the methods and reactions employed in chemical analysis, being explanatory of the work done in the laboratory; one lecture a week during the session. (*b*) A course on Industrial Chemistry; two lectures a week during the first term. (*c*) An elementary course on Organic Chemistry; two lectures a week during the second term. (*d*) A course on the composition and analysis of Iron and Steel; one lecture a week during the second term.

The laboratory work of the third year comprises:—

(*a*) An extensive course of Analytical Chemistry, including gravimetric, volumetric and electrolytic methods. (*b*) An elementary course on the preparation of Organic Compounds. (*c*) Water Analysis and Analysis of Iron and Steel, both in the second term. *Students in the Mining Course are exempt from Organic Chemistry.*

Lectures in the fourth year comprise:—

(*a*) A systematic course on Organic Chemistry, two lectures a week. (*b*) A course on Physical Chemistry, two lectures a week. (*c*) A course on Mineral Analysis. (*d*) A short course on Gas Analysis. In the lectures on Organic Chemistry special atention is paid to the commoner substances which find application in the arts. The lectures on Physical Chemistry are divided into two parts. In the first term they include a study of such physical properties of gases, liquids, and solids as are known to depend upon their chemical constitution; also Thermo-Chemistry and the law of Mass Action. The second term is devoted to Electro-Chemistry, theoretical and applied. The lectures will be based upon the application of the gaseous laws to solutions. This will be followed by descriptions of the most recent applications of electricity to the production of metals and chemicals.

Laboratory work in the fourth year will be arranged to suit the requirements of students. Those intending to prosecute organic work will take up a complete course of Organic Preparations and Analysis, but they must also spend some time on the essential physico-chemical methods; while students of Physical Chemistry must spend enough time in the organic

laboratory to become familiar with the chief methods of organic work. Those intending to devote themselves to Mineral Chemistry will omit the Organic Chemistry, but must study the more important physico-chemical methods, and devote a large amount of time to advanced Mineral Analysis. All students in the Chemistry Course must take up Gas Analysis.

Laboratory courses will also be provided for students who wish to make a specialty of any particular branch of Industrial Chemistry, such as Chemistry of Oils, Iron and Steel Analysis, Bleaching, Papermaking, and manufacture of Chemicals, etc.

Of the above fourth year subjects students in the Mining Course take only the lectures and practical work in Mineral Analysis.

3. Civil Engineering and Applied Mechanics.

PROFESSOR:—HENRY T. BOVEY.
ASSISTANT PROFESSORS:—R. S. LEA.
E. G. COKER.
DEMONSTRATOR:—K. M. CAMERON.

1. *Theory of Structures.*—The lectures on this subject embrace:—

(*a*) The analytical and graphical determination of the stresses in the several members of framed-structures, both simple and complex, as, *e.g.*, cranes, roof and bridge trusses, piers, etc.

(*b*) The methods of ascertaining and representing the shearing forces and bending moments to which the members of a structure are subjected.

(*c*) A study of the strength, stiffness and resistance of materials, including a statement of the principles relating to work, inertia, energy, together with a discussion of the nature and effect of the different kinds of stress, and the resistance offered by a material to deformation and to blows.

(*d*) The design and proper proportioning of beams, pillars, shafts, roofs, bridge piers and trusses, arches, arched ribs, masonry dams, foundations, earth works, and retaining walls.

Graphics.—A complete course of instruction is given in the graphical analysis of arches and of bridge, roof, and other trusses, and in the graphical solution of mechanical problems. It is therefore possible for the student to apply both the ana-

lytical and graphical methods of treatment, and thus to verify the accuracy of his calculations. Dr. Bovey and Dr. Coker.

Text Book:—Bovey's Theory of Structures and Strength of Materials.

The Laboratory Work (see § XII.) is as follows:—

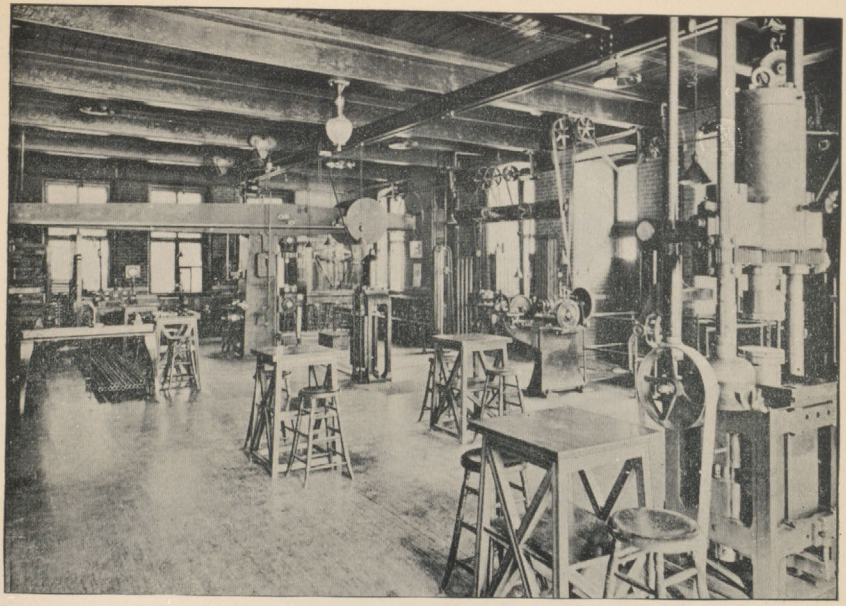
Fourth Year.—During the fourth year students are expected to engage in a research upon the physical properties of a material of construction, with special reference to the form and position of such material in the structure; or research may be taken up on the flow of water, through orifices and pipes, over weirs, and on the efficiency of vanes, pumps and hydraulic motors.

Third Year.—During the third year a systematized course of laboratory instruction is given in which students carry out for themselves a series of tests upon engineering materials. The course comprises:—

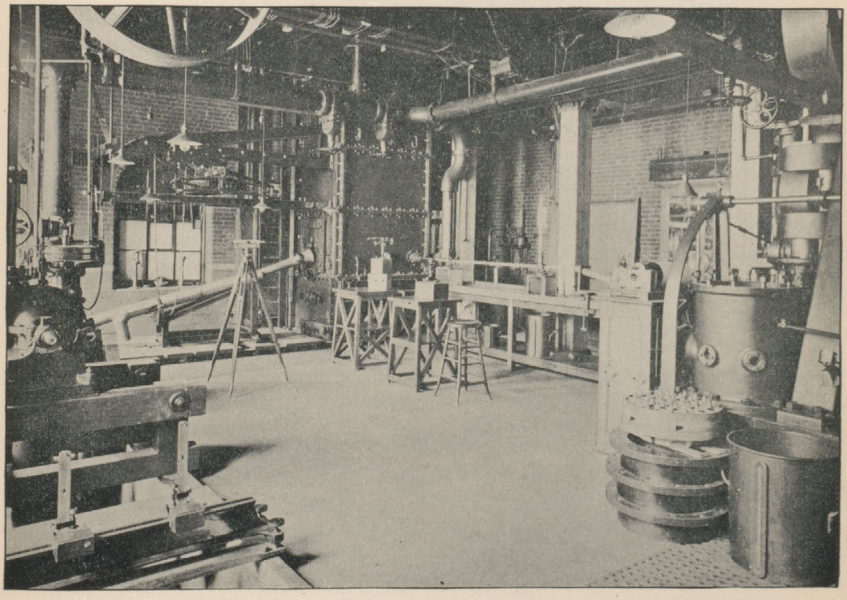
(*a*) Linear measurements by Whitworth measuring machine, dividing engine, and micrometer gauges.
(*b*) Calibration of extensometers, gauges, and the like.
(*c*) Tension tests of long wires above and below the elastic limit.
(*d*) Tensile and compressive tests of cast iron, wrought iron, steel, brass, copper, timber, stone, bricks, and cements.
(*e*) Transverse tests of beams under different conditions of loading and fixing.
(*f*) Shearing tests of iron, steel, timber, stone, and the like.
(*g*) Torsional tests of metals.
(*h*) Tests of materials under compound stress.
(*i*) Tests of chains, wire cables, spikes, screws and the like.
(*j*) Pillar tests under various conditions of loading and fixing.
(*k*) Determination of the various moduli of materials by static and dynamic methods.
(*l*) Determination of centres of gravity, moments of inertia, and moments of resistance.
(*m*) The testing of concrete and cement in accordance with standard specifications.

2. *Bridge Construction.*—A course of lectures is given on practical bridge construction, including:

(*a*) The reasons governing the selection of a particular type of bridge;



An Engineering Testing Laboratory.



Hydraulic Laboratory.

(*b*) A discussion of the loads to which the bridge will be subjected;

(*c*) The calculations of the stresses in the several members of the bridge;

(*d*) The determination of the sectional areas and forms of the members;

(*e*) The design of the connections;

(*f*) The preparation of complete engineering drawings.

Dr. Bovey and Dr. Coker.

3. *Hydraulics.*—The student is instructed in the fundamental laws governing the equilibrium of fluids, and in the laws of flow through orifices, mouthpieces, submerged (partially or wholly) openings, over weirs, through pipes, and in open channels and rivers. The impulsive action of a free jet of water upon vanes, both straight and curved, is carefully discussed, and is followed by an investigation of the power and efficiency of the several hydraulic motors, as, *e.g.*, reaction wheels, pressure engines, vertical water wheels, turbines, pumps, etc. Dr. Bovey, Dr. Coker.

Text Book:—Bovey's Hydraulics.

The laboratory work (see also § XII) will include the following:—

(*a*) *Flow through orifices.*—The determination of the co-efficients of discharge, velocity, etc.

(*b*) *Flow over weirs.*—The determination of the co-efficient of discharge with and without side contraction. Also the measurement of the section of the stream.

(*c*) *Flow through pipes.*—The determination of critical velocities and of the effect upon the flow, of angles, bends, and sudden changes in section.

(*d*) *Impact.*—The determination of the co-efficient of impact.

(*e*) *Motors, etc.*—The determination of the efficiency of Pelton and other wheels, of vortex and other turbines, of centrifugal and other pumps, etc.

4. *Hydraulic Machinery.*—The lectures in this course apply the principles of hydraulics to explain the construction and action of hydraulic presses, accumulators, lifts, rams, riveting machinery, pumps, multi-cylinder engines, workshop tools, turbines, centrifugal pumps, and the like. The design of one or two types is considered in detail.

The hydraulic transmission of power and the design and construction of central stations is also included. Dr. Coker.

5. *Municipal Engineering.*—The lectures on this subject will embrace:—

(*a*) *Water Supply.*—The quantity and quality of water; systems and sources of supply; rainfall and evaporation; storage as related to the supplying capacity of water-sheds; natural and artificial purification; distribution, including the location of mains, hydrants, stop-valves, etc.; combined or separate fire and domestic systems; details of construction, including dams, reservoirs, pumps, etc.; preliminary surveys, estimates of cost, statistics, etc.

(*b*) *Sewerage of Cities and Towns.*—The various systems for the removal of sewage; special methods in use for its treatment and ultimate disposal; the proportioning and construction of main, branch, and intercepting sewers; man-holes, flush-tanks, catch-basins, etc.; materials used in construction; estimates of cost. Mr. Lea.

6. *Structural Engineering.*—A special course of lectures on this subject is given by Messrs. E. S. S. Mattice, B.A.Sc., and M. C. J. Beullac, B.Sc., of the Dominion Bridge Company. For details of this course see § XI, 1, p. 162.

4. Descriptive Geometry.

LECTURERS:—C. H. McLEOD.
H. F. ARMSTRONG.

This course deals with the methods of representing objects on one plane so that their true dimensions may be accurately scaled. It discusses the methods employed in the graphical solution of the various problems arising in engineering design, and deals generally with the principles underlying all constructive drawing. The methods taught are illustrated by applications to practical problems. It is the aim of the work to develop the imagination in respect to the power of mentally picturing unseen objects, and, incidentally, precision in the use of the drawing instruments is attained.

First Year.—Geometrical drawing, orthographic projections, including penetrations, developments, sections, etc.; isometric projection. Mr. Armstrong.

Second Year.—Problems on straight line and plane; projections of plane and solid figures; curved surfaces and tan-

gent planes; intersections of curved surfaces; axometric projections; shades and shadows. Professor McLeod.

Third Year.—Mathematical perspective and perspective of shadows, etc.; spherical projection, and the construction of maps. (This course is given under Surveying and Geodesy, see XI, 16, p. 188).

5. Electrical Engineering.

PROFESSOR:—R. B. OWENS.

ASSISTANT PROFESSOR:—L. A. HERDT.

DEMONSTRATORS:———————

UNDERGRADUATE COURSES.

1. *Continuous Currents and Commutating Machinery.*—The theoretical consideration of continuous current flow in circuits of different kinds; the laws of electro-magnetism and of the magnetic circuit; the action and principles of design of commutating and rectifying machinery:—required of students in Electrical and Mechanical Engineering.

T. and Th., 9-10—Mr. Herdt. First and second terms.

Text-books:—Elements of Electricity and Magnetism, J. J. Thomson; Magnetic Induction of Iron and other Metals, J. A. Ewing; Continuous Current Dynamos. J. Fisher-Hinnen; Design of Dynamos, S. P. Thompson.

2. *Alternating Current and Alternating Current Machinery.*—The theoretical consideration of variable current flow in circuits containing resistance, inductance and capacity under different conditions; the action and principles of design of synchronous and induction machinery:—required of students in Electrical Engineering. Must be preceded by course 1.

W., Th. and F., 11-12—Professor Owens. First and second terms.

Text-books:—Theoretical Elements of Electrical Engineering, C. P. Steinmetz; Alternating Currents and Alternating Current Machinery, D. C. Jackson.

3. *Electric Lighting and Power Distribution.*—The design and operation of central and isolated lighting and power plants; the design and construction of distributing lines; arc and incandescent lighting; the applications of stationary motors to

general power purposes:—required of students in Electrical Engineering. Must be preceded by course 1.

T., W. and F., 10–11—Mr. Herdt. Second term.

Text-books:—Electric lighting, F. B. Crocker; Electric Power Transmission, Louis Bell.

4. *Electric Traction.*—Determination of power required to accelerate and draw, at different speeds, loads under varying track and other conditions; car equipment as affected by nature of service; track construction; systems of distribution for urban and for heavy through traffic conditions:—required of students in Electrical Engineering. Must be preceded by course 1.

T., W. and F., 10–11—Mr. Herdt. Second term.

Text-books:—The Electric Railway, Louis Bell. Students are furnished with supplementary notes.

5. *Electrical Designing.*—(*a*) Detailed electric and magnetic calculations and complete drawings for a commutating machine, a synchronous machine and a transformer or an induction motor:—required of students in Electrical Engineering. Must be preceded by course 1 and taken in conjunction with course 2.

Saturday, 9-1..Professor Owens. First and second terms.

Text-books:—Continuous Current Dynamos, J. Fisher-Hinnen; The Induction Motor, B. A. Behrend. Supplemented by MS. notes and data.

(*b*) Complete plans and estimates for an isolated or central lighting or power plant, including distributing system:—required of students in Electrical Engineering. Must be preceded by course 1 and taken in conjunction with courses 3 and 4.

Mr. Herdt. First and second terms.

Text-books:—No text-books. Notes and data are furnished.

6. *Electrical Engineering Laboratory.*—(*a*) Includes such tests of direct current metering and controlling devices, dynamos, motors, boosters, motor-generators, dynamotors, converters, open and closed coil, constant current machines and arc and incandescent lamps as illustrate the principles of their action and the limits of their proper use; also complete test of direct current isolated or central lighting or power plant:—required of students in Electrical Engineering. Must be taken in conjunction with or be preceded by course 1.

T., Th., 2-5—Professor Owens, Mr. Herdt. First and second terms.

Text-books:—Handbook for the Electrical Laboratory and Testing Room, J. A. Fleming. In addition, students are furnished with special laboratory notes and forms.

(*b*) Includes experiments on variable current flow in circuits of different kinds; tests of alternators, synchronous motors and converters, compensators, induction motors, transformers, frequency and phase-changing apparatus, potential regulators, reaction coils, etc., and complete test of alternating lighting or power plant:—required of students in Electrical Engineering. Must be preceded by course 1 and taken in conjunction with course 2.

M., W. and F., 2-5—Professor Owens, Mr. Herdt. First and second terms.

Text-books:—No text-books. Students are furnished with special laboratory notes and forms.

7. *Telegraphy and Telephony.*—Single duplex, quadruplex and multiplex telegraph systems, telephone systems, current generation for telegraph and telephone work, central telegraph and telephone stations; line construction and testing; special systems of signalling:—optional. One lecture per week, at time to be arranged—Professor Owens. First term.

Text-books:—Telegraphy, Preece and Sievewright; A manual on Telephony, Preece and Stubbs.

Graduate Courses.

8. *Special problems in the theory and practice of alternating current working.*—Two lectures per week at time to be arranged—Professor Owens. First and second terms.

9. *Special problems in Electric Traction.*—One lecture per week at time to be arranged—Mr. Herdt. First and second terms.

10. *Advanced Laboratory Investigations.*—Special research work by students having necessary previous training—Professor Owens, Mr. Herdt.

11. *Electrical Engineering Seminar.*—Weekly meetings are held, at which students present carefully prepared papers upon current engineering literature and special topics in connection with their studies or their laboratory work—Professor Owens, Mr. Herdt.

6. English Language and Literature.

PROFESSOR:—C. E. MOYSE.
LECTURER:—J. W. CUNLIFFE.

In view of the importance of accuracy of expression to those engaged in scientific or professional work, a course in English Composition is prescribed for all undergraduates of the first year, and no student will be allowed to enter the second year until he has given satisfactory proof that he is able to write intelligently, clearly, and correctly. In order to make the instruction as practical as possible, short essays on current events and simple literary and historical subjects are required weekly, and will be commented upon in class in illustration of the points advanced in the lectures, which will aim at explaining the elementary principles of composition. (Two hours a week.) The hand-book used is Carpenter's Elements of Rhetoric, First High School Course (Macmillan Co.), and every member of the class is required to provide himself with a copy. Students who prove themselves competent may be excused further work in composition, and additional exercises will be required from those who are backward. Satisfactory results must be obtained in the regular essay work, as well as in the examinations, in order to pass in the subject. A short course of lectures will be given introductory to the course of Summer Reading.

Summer Reading.—During the vacation, students entering the second year are expected to read certain standard works in literature and fiction, on which an examination will be held in the beginning of October. The marks obtained in this examination will be reckoned in determining the relative standing at the sessional examinations at the end of the second year.

The works selected for the vacation of 1903 are:—

Shakspere's Henry V., ed. Deighton (Macmillan);

Goldsmith's Vicar of Wakefield;

Scott's Waverley;

Stevenson's Kidnapped.

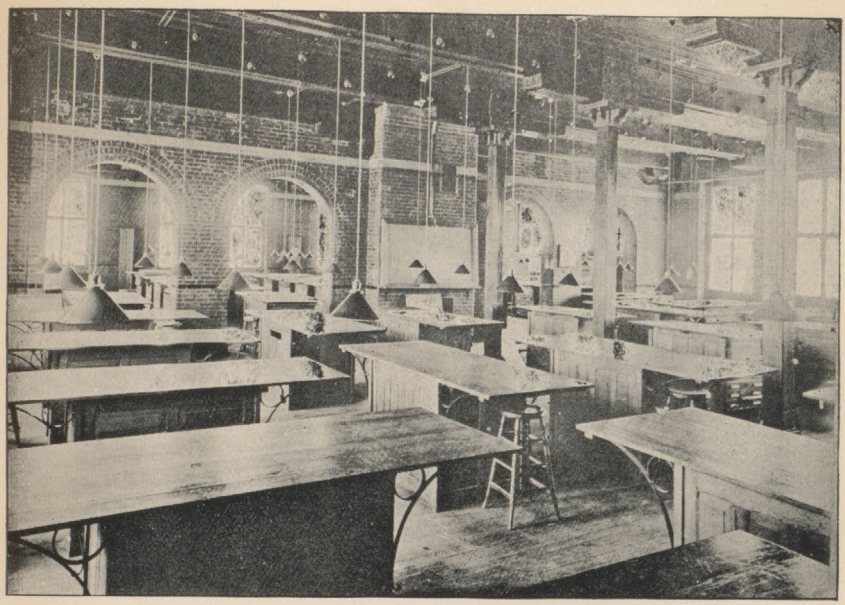
French Students may substitute for the above the following:—

Corneille—Le Cid, Horace.

V. Hugo—Hernani, Ruy Blas.

Balzac—Eugenie Grandet.

Students will also be required to possess some knowledge of the lives of the above French authors.



In the Drawing Rooms.



Carpenter Shop.

Students who have already taken equivalent courses in this, or in any other university, may be exempted from a part or from the whole of the above work, on written application to the Dean.

7. Freehand Drawing, Lettering, Etc.

ASSISTANT PROFESSOR:—H. F. ARMSTRONG.

In the *Freehand Course*, the object is to train the hand and eye so that students may readily make sketches from parts of machinery, etc., either as perspective drawings in light and shade, or as preparatory dimensioned sketches from which to make scale drawings.

In the *Lettering Course*, plain block alphabets, round writing, and titles, will be chiefly dealt with. In this course, also, tinting, tracing, blue printing and simple map drawing will be included.

8. Geology.

PROFESSOR:—F. D. ADAMS.
DEMONSTRATOR:—A. W. G. WILSON.

The courses are arranged as follows:—

Third Year.—

General Geology.—The lectures will embrace a general survey of the whole field of Geology, and will be introduced by a short course on Mineralogy. Especial attention will be devoted to Dynamical Geology and to Historical Geology, including a description of the fauna and flora of the earth during the successive periods of its past history, as well as to the economic aspects of the subject.

The lectures will be illustrated by the extensive collections in the Peter Redpath Museum, as well as by models, maps, sections and lantern slides. There will be an excursion every Saturday until the snow falls, after which the excursion will be replaced by a demonstration in the Museum.

Text Book:—Scott, An Introduction to Geology.

Petrography.—The modern methods of study employed in Petrography are first described, and the classification and description of rocks is then taken up.

In addition to the lectures, one afternoon a week dur- the second term will be devoted to special microscopical work in the Petrographical Laboratory.

Text Book:—Harker, Petrology for Students.

Ore Deposits, Economic Geology and Practical Geology.—The nature, mode of occurrence and classification of Ore Deposits will first be taken up. A series of typical occurrences will then be described and their origin discussed. The more important non-metallic materials, *e.g.*, fuels, clays, abasive materials, building stones, etc., will be similarly treated as well as questions of water supply, artesian wells, etc. The methods employed in carrying out geological and magnetic surveys and in constructing geological sections will then be taken up, with special studies in folding, faulting, etc.

The course will be illustrated by maps, models, lantern slides and specimens.

Text Books:—Geikie, Outlines of Field Geology; Kemp, Ore Deposits of the United States and Canada; Phillips and Louis, A Treatise on Ore Deposits.

Books of Reference:—The Monographs of the U. S. Geological Survey, and the Reports of the Geological Survey of Canada.

Canadian Geology.—A general description of the Geology and Mineral Resources of the Dominion.

Petrographical Laboratory.—See § XII, 11. This laboratory is open to Fourth Year mining students during the second term.

Physiography.—The course will consist of a study of the principal types of Land Forms and their influence upon human development. Attention will be given more particularly to the practical bearing of the subject on engineering work. During the latter part of the course, a brief description of the salient physical features of Canada will be presented.

The course will be illustrated by maps, models and lantern slides.

Field Work.—The students in mining will receive a course of instruction in geological mapping and field work—extending over one week—in connection with the summer school of mining.

NOTE.—Students of the Mining and Chemistry courses take all the Mineralogy of the third year. Mining Students take all courses of the fourth year. Chemistry Students take, in addition to the Geology of the third year, the Mineralogy of the fourth year.

The Petrographical Laboratory is open to fourth year Mining Students during the second term.

9. Mathematics and Mathematical Physics.

PROFESSOR:—G. H. CHANDLER.
LECTURER:—R. S. LEA.

The work in this department is conducted from the outset with special reference to the needs of students of applied science. Much time is given to practice in the use of mathematical tables, particular attention being paid to the solution of triangles, the tracing of curves, graphical representation of functions, reduction of observations, etc.

The courses of study are as follows:—

FIRST YEAR.

Geometry.—Exercises on Euclid, including Loci, Transversals, etc.; elements of Solid Geometry and of Geometrical Conic Sections.

Algebra.—Miscellaneous theorems and exercises; Complex Numbers; Elementary Determinants.

Trigonometry.—Plane and Spherical.

Mechanics.—An elementary course in Kinematics, Kinetics, Statics, and Hydrostatics.

SECOND YEAR.

Analytic Geometry.—The Point, Straight Line, Circle, Parabola, Ellipse and Hyperbola.

Differential and Integral Calculus.—Differentiation of functions of one or more variables; Successive differentiation; Tangents, etc.; Multiple Points; Asymptotes; Curvature; Maxima and Minima; Integration, with application to Areas, Volumes, Moments of Inertia, etc.

Mechanics.—Kinematics; Kinetics of a Particle; Statics.

THIRD YEAR.

Analytic Geometry.—Conjugate Diameters; General Equations of the Second Degree; Elements of Geometry of Three Dimensions.

Calculus.—Various Applications; Elementary Differential Equations.

Mechanics.—Kinetics of a Rigid Body; Centres of Pressure, etc.

Classes may also be held for advanced (optional) work in the above or other subjects. Students taking graduate courses will receive guidance in any advanced Mathematics required in connection with their work.

Text-books. *First Year*:—Wilson's Solid Geometry and Conic Sections (Macmillan); Hall & Knight's Elementary Algebra (Macmillan); Murray's Plane and Spherical Trigonometry (Longmans); Blaikie's Dynamics (J. Thin, Edinburgh); Bottomley's Mathematical Tables (Macmillan); Chambers's Mathematical Tables. *Second and Third Years*:—Wentworth's Analytic Geometry (Ginn & Co.); Chandler's Calculus (E. M. Renouf, Montreal); Wright's Mechanics (Van Nostrand).

10. Mechanical Engineering.

PROFESSOR:—R. J. DURLEY.
ASSISTANT PROFESSOR:—H. M. JAQUAYS.
DEMONSTRATORS:—A. R. ROBERTS. O. HALL.

1. *Kinematics of Machines.*—(Wednesday, 11; Thursday, 10).

Definitions; mechanisms and machines; kinematic pairing; velocity and acceleration in mechanisms; centrodes; restraint in mechanisms; analysis of the quadric crank chain, the slider-crank chain, and the double-slider crank chain; higher pairing in mechanisms; cams; ratchet and click trains; chamber-crank and chamber-wheel trains; mechanisms involving non-rigid links; screw motion and spheric motion in mechanisms.

Text-book.—Durley's Kinematics of Machines (Wiley).

2. *Dynamics of Machines.*—Third Year.—(Monday, 10; Wednesday, 9). Elementary dynamics of the steam engine; diagrams of crank effort; fluctuation of energy and speed; fly-wheels; friction of journals and pivots; graphic treatment of friction in mechanisms; brakes; dynamics of belt and rope driving; transmission and absorption dynamometers.

Fourth Year.—(Tuesday, 9; Wednesday, 9; Thursday, 12.) Balancing of double and single acting engines; dynamics of the connecting rod; gyrostatic action in machines; theory of gov-

ernors; graphic methods in dynamics; vibration in machines; knocking of steam engines.

3. *Machine Design.*—Third Year.—Thursday, 10. Principles of the Strength of Materials as applied to the design of the parts of machines; fastenings used in machine construction, bolts, screws, keys, cotters, rivets and rivetted joints; journals and bearings; shafts and couplings.

Fourth Year.—(Monday, 9; Wednesday, 12).—Design of wheel gearing; belts, ropes and pulleys; pipes and pipe joints; cylinders; eccentrics, pistons and piston rods, connecting rods, cross-heads and other engine details; flywheels; design of valves and valve gears.

Text-book:—Unwin's Machine Design (Longmans, 2 Vols.).

Book of Reference—Low and Bevis' Machine Drawing and Design. (Longmans.)

4. *Mechanical Drawing and Designing.*—Second Year.—(Monday and Thursday, 2). Elementary principles of mechanical drawing and draftsmanship; preparation of working drawings of simple machine details; making dimensioned sketches of machines and their parts, dimensioning and conventional colouring of drawings; preparation of tracings.

Third Year (Monday and Thursday, 2).—Designing of simple machine parts; more difficult exercises in mechanical drawing; engine designing.

Fourth Year (Monday and Thursday, 2).—The complete design of a machine, such as a steam engine, a pump, or a machine tool, is worked out, and the requisite working drawings and tracings are prepared.

5. *Mechanical Engineering.*—(Thursday, 10; Friday, 9). Steam boilers and steam production; fuel and combustion; corrosion and defects of boilers; boiler installations; the steam engine—estimation of power developed under various conditions; the indicator and its diagrams; steam distribution, and performance of pumping and air-compressing machinery, as shown by the indicator; economy of steam machinery; gas and oil engines; gas producers; mechanical distribution of power, and losses of power, in power installations and workshops; air compressors; fans; pumping machinery; steam engine valves and valve gears; valve diagrams; speed regulation in steam engines; lubrication in steam engines; steam turbines and engines for special services; relation between weight and power in steam

machinery; marine engines and ship propulsion; elements of locomotive engineering; tractive force in locomotives; train resistance; brakes; refrigerating machinery.

Books of Reference:—Ewing's The Steam Engine (Camb. Univ. Press); Lineham's Mechanical Engineering (Chapman & Hall); Hutton's Mechanical Engineering of Power Plants (Wiley).

6. *Thermodynamics.* See page 191.
7. *Laboratory Instruction.* See pages 198 and 204.
8. *Workshop Practice.* See pages 207 and 208.

Graduate Courses.

The graduate courses in Mechanical Engineering comprise experimental research work of the following kinds:—

Tests of the economy and performance of steam engines and boilers, air and gas engines, and air compressors; experiments on the behaviour of superheated steam, on cylinder condensation, on feed heating, and on the value of fuels; experiments on the properties and relative values of lubricants, on transmission and absorption dynamometers, on the efficiency of transmission machinery and of machine tools; tests of fans and blowers; experiments on the flow of air and of steam; researches on the tempering and welding of various materials, on the properties of alloys and on the action of cutting tools.

11. Metallurgy.

Professor:—Alfred Stansfield.
Demonstrator:—Edwin B. Tilt.

I. The undergraduate courses for Metallurgical and Mining students are as follows:—

Third Year.—(1) General Elementary Metallurgy, including introduction, fuels, furnaces and refractory materials, typical metallurgical operations and reactions. Two lectures a week during first term.

Text-book:—Huntingdon and Macmillan, "Metals, their Properties and Treatment."

(2) Fire Assaying, including introductory, furnaces and appliances, balances and wet assay apparatus, sampling and preparation of ores for assay, fluxes and reagents, assays of gold, silver, and lead ores, assays of bullion and base bullion.

Lectures, demonstrations, and laboratory work,—50 hours, during Second term.

Text-book:—Furman, "Manual of Practical Assaying."

Fourth Year (3) The Metallurgy of iron and steel, copper, lead, gold and silver. The lectures cover the more important dry, wet and electrical methods of extracting these metals from their ores, and refining them. The chemical, physical and mechanical properties of the metals are also considered. The milling and amalgamation, cyaniding and chlorination of gold and silver ores are excluded from this course, as they are treated in the lectures on ore-dressing (see Mining (6)).

Two lectures a week in first term and three lectures a week in second term. Laboratory, see (8).

Books of Reference:—T. Turner, "Metallurgy of Iron"; H. M. Howe, "Metallurgy of Steel"; F. W. Harbord, "Metallurgy of Steel"; H. H. Campbell, "Manufacture and Properties of Structural Steel"; E. D. Peters, "Modern Copper Smelting"; H. O. Hoffman, "Metallurgy of Lead"; H. F. Collins, "Metallurgy of Silver and Lead"; T. K. Rose, "Metallurgy of Gold"; M. Eissler, "Metallurgy of Gold"; C. Schnabel, "Handbook of Metallurgy," Vol. I.

(4) Alloys,—their constitution, manufacture and properties; fuels and refractory materials,—their examination and use, including calorimetry and pyrometry. One lecture a week during second term.

Books of Reference:—W. C. Roberts-Austen, "Introduction to the Study of Metallurgy"; R. H. Thurston, "Materials of Engineering."

(5) Metallurgical Problems.—One lecture a week during second term. (This course is alternative with Hydraulics).

(6) Additional lectures are given in the third and fourth years to Metallurgical students. In these lectures the metallurgy and electro-metallurgy of the remaining metals is considered, and attention is given to laboratory and research work in metallurgy and to furnace construction and cost of metallurgical operations.

(7) Metallurgical Machinery (see p. 182).

(8) Laboratory:—One whole day and one half day per week are given to work in the Ore Dressing and Metallurgical Laboratories. In the first term this time is evenly divided between Ore Dressing and Metallurgy, and certain typical operations in

each are carried out either as demonstrations, or by groups or individual students.

The whole time in the laboratory in the second term is given to thesis work, and in this individual work each student is permitted to elect between ore dressing and metallurgy, and, when practicable, to select his own special subject.

The following metallurgical exercises will be carried out, as far as time will permit, during the first term, either as demonstrations, individual work, or work in groups. During the second term, any of these or some similar exercises may be selected by the students as their thesis work:—

(*a*) Roasting a sulphide or arsenical ore on a small scale and also in the large roasting furnaces.

(*b*) Formation and properties of copper or lead mattes and slags.

(*c*) Smelting a copper or lead ore in the water jacketed blast furnace.

(*d*) Melting and casting certain metals and alloys.

(*e*) The use of the electric furnace.

(*f*) Cyaniding or chlorination of a gold ore.

(*g*) Leaching a copper or silver ore.

(*h*) Elementary exercises in some of the following:—

Pyrometry, Calorimetry, Flue Gas Analysis, Tests of Refractory Materials, Microscopic Examination of Metals, Heat Treatment of Iron or Steel.

The details of the ore dressing work are given in Mining (8).

II. Graduate Courses.—Special advanced courses of laboratory work are offered in Metallurgy and Assaying.

III. Metallurgical and Assaying Laboratories.—For description, see p. 198.

IV. Metallurgical Excursions and Summer Schools.—Students attending the courses in Mining and Metallurgy are required to attend the Summer School in Mining (see Mining VI.) at the end of their third year.

At this school, when practicable, a portion of the time is devoted to a thorough examination of some metallurgical establishments.

In addition to this, excursions may be made by the class from time to time to such metallurgical works as are within reach.

12. Meteorology.

Instruction in meteorological observations will be given in the observatory at hours to suit the convenience of the senior students.

Certificates will be granted to those students who pass a satisfactory examination on the construction and use of meteorological instruments, and on the general facts of meteorology.

13. Mineralogy.

PROFESSOR:—B. J. HARRINGTON.

The courses are arranged as follows:—

Third Year:—

Mineralogy.—Lectures and demonstrations illustrated by models and specimens in the Peter Redpath Museum. Among the subjects discussed are: crystallography; physical properties of minerals dependent upon light, electricity, state of aggregation, etc.; chemical composition, calculation of mineral formulæ, quantivalent ratios, etc.; principles of classification, description of species.

Determinative Mineralogy.—Laboratory practice in blow-pipe analysis and its application to the determination of mineral species.

Fourth Year:—

Mineralogy (in continuation of the course in third year)—Description of species, particular attention being paid to those which are important as rock constituents and to the economic minerals of Canada.

14. Mining Engineering.

PROFESSOR:—JOHN BONSALL PORTER.
FELLOW IN MINING:—C. V. CORLESS.
DEMONSTRATOR:—H. P. DEPENCIER.

I. The undergraduate courses in detail are as follows:—

Third Year.—(1) Mining. Excavation, explosives and blasting; rock drills, coal cutters, etc.; gold washing, river mining, hydraulic mining and gold dredging. (One lecture per week. This course is continued in the fourth year, see Mining 4).

(2). Ore dressing. The theory and practice of ore dressing and coal washing; the forms in which ores occur and the

effect of mixture, impurity, etc.; the theoretical considerations affecting mineral separations; the general mechanical operations involved; Dressing Machinery—breakers, rolls, screens, jigs, vanners, tables, washers, buddles, magnetic separators, etc. (Two hours per week in the second term. This course is continued in the fourth year. See Mining 6).

(3). Laboratory. Simple examinations and tests of ores, sands, and gravels, by means of pan, vanning shovel, hand jig, magnet, classifier, etc. (Eight afternoons in the second term. Further laboratory work in the fourth year, see Mining 8).

Fourth Year.—(4). Mining Engineering. The Principles and Practice of mining; prospecting, sinking, drifting, developing, methods of mining, timbering, hauling, hoisting, drainage, lighting, ventilating, etc.; mine accidents and their prevention; general arrangement of plant, administration, stores and dwellings; examination and valuation of mines and mineral prorperties and mine reports. (Two lectures a week in the first term and three in the second).

(5). Mining and Metallurgical Machinery; the generation, transmission and utilization of power in mining, ore dressing, and metallurgy; steam, hydraulic and electric power plants, air compressors, blowing engines, dynamos, transmission lines, motors, conveyors, cranes, hoists, pumps, ventilating machinery, etc. (Two lectures a week and twelve afternoons in the designing room).

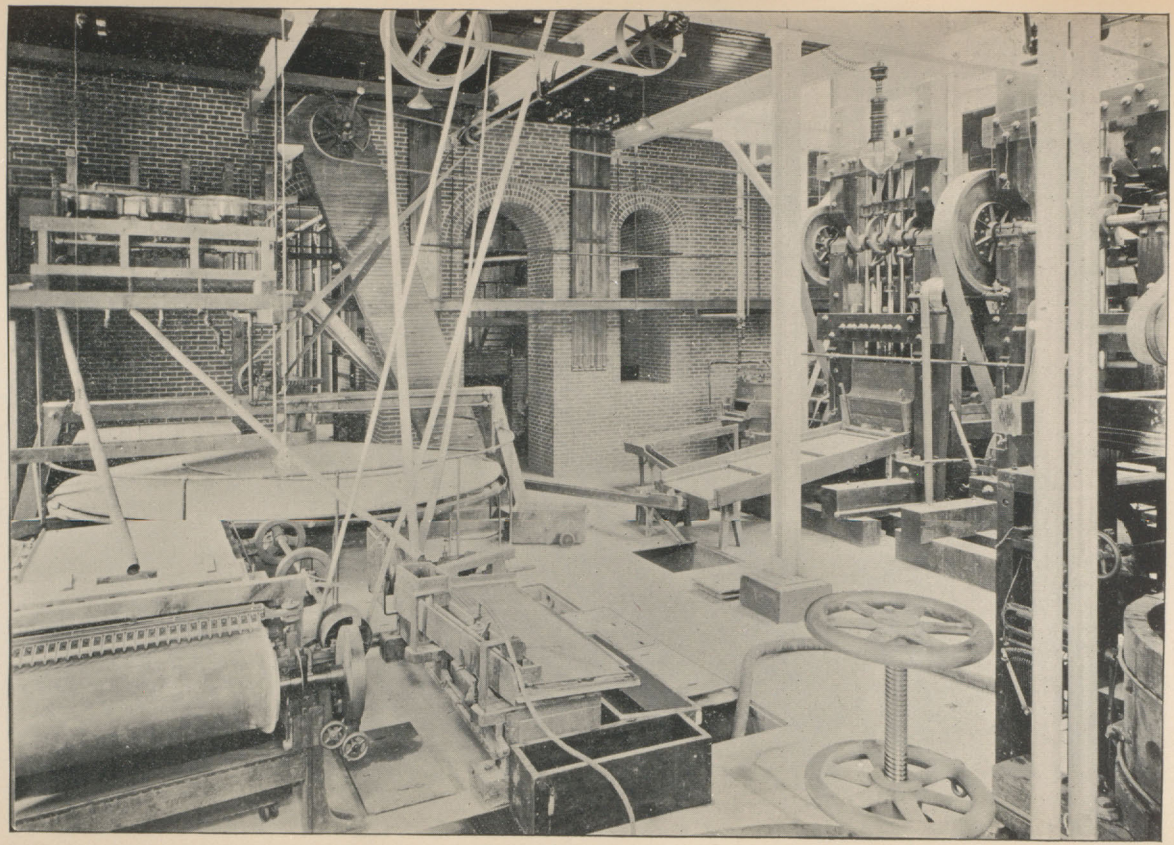
(6). Ore Dressing and Milling. Continuation of the ore dressing course of the third year; concentration plants, coal breakers and washers, dry concentration, amalgamation, gold and silver milling, cyaniding, chlorinating, etc. (Two lectures a week in the first term).

(7). Mining Colloquium. One hour a week throughout the session is given to informal discussion of the work being done in the department and of other matters relating to mining and ore dressing. Students are required to take active part in these discussions.

TEXT BOOKS :—

No set text-books are used, but students are recommended to freely consult the following works of reference, in addition to the special references given from time to time:—

C. Le Neve Foster's Ore and Stone Mining; H. W. Hughes' Coal Mining; Ihlsing's Manual of Mining; W. B. Kunhard's



Milling Room in the Mining Department.

Ore Dressing in Europe; R. H. Richard's Ore Dressing; T. A. Rickard's Stamp Milling of Gold Ores; H. Louis' Handbook of Gold Milling; T. K. Rose's Metallurgy of Gold; M. Eissler's Metallurgy of Gold; H. F. Collins' Metallurgy of Silver; The Coal and Metal Miners' Pocket-book.

(8). Laboratory. One whole day and one-half day per week are given to work in the ore dressing and metallurgical laboratories. In the first term this time is evenly divided between Ore Dressing and Metallurgy and certain typical operations in each are carried out either as demonstrations or by individuals or groups of students. In the second term each student is permitted to elect between Mining, Ore Dressing and Metallurgy and to choose an individual subject or thesis, and the whole of the laboratory time in the second term is given to this thesis work.

The set exercises in Ore Dressing comprise a series of experiments in crushing, classifying, jigging, slime treatment, magnetic separation, and amalgamation, and include a complete trial run of the five-stamp battery on a free milling gold ore.

The number of subjects available for thesis work is very great, and ranges from purely theoretical investigations in classification, concentration, etc., to the experimental determination of the best methods of treatment of ores and coals. Nearly one hundred different lots of ore are available, and the quantities are sufficient for work on a comparatively large scale.

The metallurgical work is detailed in Metallurgy 11 (8).

II. Graduate Courses:—Special courses in advanced work are also offered in both Mining and Ore Dressing, and these courses, owing to the unequalled equipment of the new laboratories, as detailed elsewhere, can be made exceedingly valuable, both theoretically and practically.

III. Laboratories:—The admirable laboratories of the University are of peculiar advantage to students in the Mining Course, and enable them not only to become acquainted with the theory of their subject, but to personally investigate its methods on a large scale.

During the first three years of the course the students do systematic work in the several workshops and laboratories of the other departments. During the last half of the third and the whole of the fourth year they spend a large proportion of

their time in the special laboratories for Ore Dressing and Metallurgy. (See § XII). In these, the general method is first to conduct before the whole class a limited number of important typical operations in ore dressing and metallurgy, and then to assign to each student certain methods which he must study out in detail, and upon which he must experiment and make written report. In this work he is guided by the professors and demonstrators, and assisted by the other students, whom he must in turn assist when practicable. In this way every student acquires detailed knowledge of certain typical operations and a fair general experience in all the important methods in use.

IV. Illustrations, Museums, Societies, Etc.:—In addition to a large series of lantern slides, the department owns a collection of about twenty-five hundred photographs and other illustrations, the most important of which are kept in sets and sold at cost price, to such students as wish to retain them. This collection is constantly being enlarged.

The Museums of the new building contain suites of ores, fuels and metallurgical materials, models of mines and furnaces, and specimens of finished products.

The McGill University Mining Society meets fortnightly to read and discuss papers by graduate and student members, and from time to time to hear lectures given by gentlemen eminent in the profession.

The Society has recently been made a students' section of the Canadian Mining Institute, and its undergraduate members are therefore student members of the Institute, and receive all its publications. Papers read before the Mining Society may be entered in competition for any students' prizes offered by the Institute. See p. 145.

VI. Summer School in Mining:—The summer vacation class instituted in 1897 is now a fixed part of the course. All students of Mining in regular course are required to attend this class at the end of the third year.

The school lasts about six weeks. Of this period about one-sixth is given to field work in Geology, one-half or more to mining work proper and the remainder, when practicable, to an examination of ore dressing and milling plants and metallurgical establishments. The professor of mining and his assistant go with the party and hold daily demonstrations or classes. The students take notes and sketches on the ground,

and afterwards are required to work up these notes and to submit a formal report on some part or the whole.

The work in Metallurgy and Geology is carried on by officers of these departments, who attend the school for this purpose, and in certain cases it may be found practicable to permit students especially interested in these subjects to substitute additional work in them for a portion of the mining.

In 1898 and again in 1902 the school was held in the coal region of Cape Breton and the gold region of Nova Scotia. In 1899 the anthracite region of Pennsylvania and metallurgical works at Bethlehem and Philadelphia, Pa., and Perth Amboy, N. J., were visited. In 1901 the school was held in British Columbia, and the most important camps were studied. In 1903 it is proposed to visit the copper and iron mines of Northern Michigan.

The instruction given during this summer course is free to all mining students, the only expense to them being the cost of board, lodging, and railway fares, and every effort is made to keep these expenses as low as is practicable.

As some students may have difficulty in finding even this sum in addition to the cost of the regular course, a fund has been provided by Sir William Macdonald, and deserving students who require aid can have money advanced them by applying to the professor of mining.

15. Physics (Experimental).

PROFESSORS:—JOHN COX.
E. RUTHERFORD.
ASSISTANT PROFESSOR:—H. T. BARNES.
DEMONSTRATORS:—A. G. GRIER.
S. J. ALLEN.

The instruction includes a fully illustrated course of Experimental Lectures on the general Principles of Physics (embracing, in the first year—*The Laws of Energy—Heat, Light, and Sound*; in the second year—*Electricity and Magnetism*), accompanied by courses of practical work in the laboratory, in which the students will perform for themselves experiments, chiefly quantitative, illustrating the subjects treated in the lectures. Opportunity will be given to acquire experience with all the principal instruments used in exact physical and practical measurements.

LABORATORY COURSE.

Three hours per week spent in practical measurements in the Macdonald Physical Laboratory in conjunction with the lecture courses.

Sound.—Velocity of Sound; determination of rates of vibration of tuning forks; resonance; laws of vibration of strings.

Light.—Photometry; laws of reflection and refraction; focal lengths and magnifying powers of mirrors, lenses, telescopes and microscopes; the sextant; spectroscope, spectrometer, diffraction grating, optical bench, polariscopes.

Heat.—Construction and calibration of thermometers; melting and boiling points; air thermometer; expansion of solids, liquids and gases; calorimetry; pyrometry.

Text-books:—Deschanel, Part IV.; or Ganot; Jones, Sound, Light and Heat; Wright, Heat; Tory and Pitcher, Laboratory Manual; Chandler, Laboratory Manual.

Magnetism and Electricity.—Measurements of pole strength and moment of a magnet; the magnetic field; methods of deflection, and oscillation; comparison of moments and determination of the elements of the earth's magnetism; frictional electricity.

Current Electricity.—A complete course of measurements of current strength, resistance, and electromotive force; calibration of galvanometers; the electrometer; comparison of condensers; electromagnetic induction.

Text-books:—S. P. Thompson, Electricity and Magnetism; Tory and Pitcher, Laboratory Manual.

Second Year.—Electrical Engineering students are given an extra laboratory period of 3 hours per week, which allows of a more extended and complete course of experimental work.

Third Year.—Students of Electrical Engineering will continue their work in the Physical Laboratory in the third year. The following is a brief outline of the course:—

Magnetic elements and measurements; use of variometers; testing magnetic qualities of iron; theory and practice of absolute electrical measurements; comparison and use of electrical standards of resistance, E.M.F., self-induction, and capacity; principles of construction of electrical instruments; testing and calibration of ammeters, voltmeters and wattmeters; insulation and capacity tests; electrometers and ballistic methods; con-

struction and treatment of storage cells; testing for capacity and rate of discharge; electric light photometry.

The following are some of the sections in which special provision has been made for advanced physical work:—

Heat.—Thermometry:—comparison and verification of delicate thermometers; air thermometry; measurement of high temperatures; electrical resistance thermometers and pyrometers; thermo-electric pyrometers.

Calorimetry:—Mechanical equivalent of heat; variation of specific heat with temperature; latent heat of fusion and vaporisation; heat of solution and combustion; electrical methods; radiation and conduction of heat with special methods and apparatus; dynamical theory of gases; viscosity; surface tension; variation of properties with temperature.

Light.—Photometric standards; spectro-photometry; theory of colour vision; spectroscopy and spectrum photography; compound prism spectrometers; six inch and 2½ inch Rowland gratings; study of spectra of gases; fluorescence and anomalous dispersion; polarimetry; Landolt and other polarimeters; form of wave surface.

Sound.—Velocity in gases and various media; absolute determinations of period; harmonic analysis of sounds; effects of resonance and interference.

Electricity and Magnetism.—Magnetic properties; influence of stress and torsion; influence of temperature; effects of hysteresis; magneto-optics; other effects of magnetisation; diamagnetism; electrical standards and absolute measurements; calibration of electrical instruments; insulation and capacity testing; electrometer and ballistic methods; temperature, variation of resistance, and E.M.F.; thermo-electric effects; electrolysis; chemistry of primary and secondary batteries; resistance of electrolytes; polarisation; electric discharge in gases and high vacua; dielectric strength; behaviour of insulators under electric stress, specific inductive capacity; electro-magnetic optics; alternating currents of high frequency and voltage; electrical waves and oscillations; discharge of electrification by Röntgen rays, ultra violet, uranium and thorium radiations.

Professor Cox will give a special course of lectures to advanced and graduate students, on "the relations between optics, electricity and magnetism," and Prof. Rutherford will give a course on "Radio-Activity in electric oscillations."

N.B.—Students taking a graduate course will receive guidance in any advanced Mathematics required in connection with their work.

16. Surveying and Geodesy.

PROFESSOR:—C. H. McLEOD.
ASSISTANT PROFESSOR:—J. G. G. KERRY.
DEMONSTRATOR:—H. W. JONES.

This course is designed to give the student a theoretical and practical training in the methods of land and geodetic surveying, in the field work of engineering operations, and in practical astronomy. The course is divided as follows:—

Second Year.—Chain and angular surveying: the construction, adjustment, use and limitations of the various instruments; underground surveying; topography, levelling, contour surveying; simple curves and setting out work; descriptions for deeds; general land systems of the Dominion and Provinces. Mr. Kerry.

Third Year.—Construction surveying, including the location of roads, transition curves, setting out work and calculation of quantities; geodetic, trigonometric and barometric levelling; topographic and photographic surveying; hydrographic surveying; introduction to practical astronomy; graphical determination of spherical triangles, spherical projections, construction of maps; mathematical perspective and the perspective of shades and shadows. Professor McLeod.

In the field the students of the second and third years are required to carry out the following:—(1) A chain survey. (2) A chain and compass survey. (3) A pacing survey. (4) A compass and micrometer survey. (5) A contour survey. (6) A plane table survey. (7) A survey and location of a line of road with determination of topography and contours and subsequent staking out for construction. (8) A hydrographic survey of a river channel, including measurement of discharge. (9) A survey at night illustrating underground methods. Astronomical observations with sextant and engineer's transit.

All students are required to keep complete field notes, and from them prepare maps, sections and estimates of the work.

The large drawing rooms are furnished with fixed mountings for the various instruments, in order to permit of their use and investigation during the winter months.

Fourth Year.—Practical Astronomy:—the determination of time, latitude, longitude and azimuth. Geodesy:—figure of the earth; measurements of base lines and triangulation system; adjustments and reductions of observations.

The field work of the fourth year consists in the measurement of a base-line, in triangulations and precision levelling.

The practical work in astronomy (for equipment of observatory see § XII, 6) comprises: (1). Comparisons of clocks and chronometers. (2). Determination of meridian by solar attachment. (3). Meridian, latitude and time by solar and stellar observations with the engineer's transit. (4). Latitude and time by sextant. (5). Time by astronomical transit. (6). Latitude by zenith telescope. (7). Latitude by transit in prime vertical.

Field work is required of all students of the second and third years in the courses of Civil and Mining Engineering, of the third and fourth years of the Architectural course, and of the fourth year in the Civil Engineering course. The work will begin in 1903 on 24th August, and continue for a month. The Surveying School will this year be held near Melbourne, P.Q., where a camp will be established for the accommodation of the classes.

Exercises in the geodetic laboratory (for equipment see § XII, Art. 6, p. 196), carried out in the fourth year include the following: (1) Measurement of magnifying power. (2) Determination of vernier errors. (3) Errors of graduation. (4) Measurement of eccentricity of circles. (5) Determination of errors of run of theodolite microscopes. (6) Investigation of the errors of a standard bar. (7) Graduating scales with the dividing engine, and comparison thereof on the comparator. (8) Investigation of the errors of circles on the circular comparator. (9) Determination of the constants of steel tapes. (10) Investigation of the graduation errors of steel tapes on the fifty-foot comparator. (11). Investigation of the errors of aneroid barometers. (12) Investigation of the errors of level tubes, and determination of their scale values. (13) Measurement of the force of gravity with a reversible pendulum.

The equipment of the surveying department comprises the following, in adition to the apparatus of the observatory and geodetic laboratory:—Twenty-four transit theodolites by various

makers, with solar and mining attachments; a photo-theodolite, 8-in. alt-azimuth; fifteen dumpy and five wye levels; hand levels and clinometers; two precision levels; eight surveyor's compasses; one miner's dial; three prismatic compasses; pocket compasses; two solar compasses; three marine sextants; artificial horizons; six box sextants; two reflecting circles; two large plane tables; four transverse plane tables; four current meters; Rochon micrometers; double image micrometers; field-glasses; two heliotropes; several barometers; 300 ft. and 500 ft. steel tapes suitable for base measurements; steel chains and steel bands; linen and metallic tapes; sounding lines; pickets; levelling rods; micrometer targets; slope rods; pedometers; station pointer, pantographs, planimeter, slide rules and minor appliances.

Examinations for Land Surveyors:—Any graduate in the Faculty of Applied Science, in the Department of Civil Engineering and Land Surveying, may have his term of apprenticeship shortened to one year for the profession of Land Surveyor in Quebec or Ontario or for the profession of Dominion Land Surveyor.

Text-Books:—Gillespie's Surveying, Johnson's Theory and Practice of Surveying, Shortland's Nautical Surveying, Greene's Practical and Spherical Astronomy, Nautical Almanac, Baker's Engineers' Surveying Instruments.

Transportation.

(On Common Roads, Railways and Canals.)

The lectures will embrace:—

(*a*) A brief historical review of the inception and carrying out of the great Canadian systems of transportation, and a resumé of the laws governing them.

(*b*) Common roads and streets.—Provision made for them in settling up land; the traffic for which they are suited, and the cost of hauling it over different surfaces; the materials used in their construction and the merits and cost of the various systems.

(c) Canals and rivers.—The Canadian canal system; the methods and cost of construction and maintenance; the traffic it is designed to carry; and the cost of transportation.

(*d*) Steam railroads.—The traffic they serve and the cost of handling it; the details of location and the influence of physical features and trade possibilities upon it; the cost and design of construction; the duties of the engineer upon such work; the appliances at present in use for safe and speedy handling of trains.

(*e*) Electric roads.—The traffic which they now carry; their location and construction; the reasons for their rapid extension, and their probable future.

The questions of the development and applying of motive power and the various appliances, mechanical and electrical, now in use for these special purposes, are taken up in special descriptive lectures in the mechanical and electrical departments. Mr. Kerry.

17. Thermodynamics.

LECTURER:—R. J. DURLEY.

DEMONSTRATOR:—H. M. JAQUAYS.

The course in this subject extends over the third and fourth years, and includes the following:—

Third Year—(Monday, 11; Tuesday, 10.)—Fundamental laws and equations of Thermodynamics; their application to gases and to vapours, saturated and superheated; efficiency of ideal heat engines; properties of steam, and elementary theory of the steam engine; elementary theory of gas and hot air engines.

Fourth Year—(Monday, 12; Thursday, 11.)—Theory of reversed heat engines and refrigerating machines; entropy and entropy-temperature diagrams; a thermodynamic study of the steam engine, including the behaviour of steam in the cylinder; economy of steam engines; influence of size, speed, and rate of expansion; compound expansion; the steam jacket; the testing of steam engines; more advanced theory of gas, air, and oil engines.

The advanced course is carried out as far as possible in connection with the experimental work of the thermodynamic laboratory.

Text Books:—Ewing's Steam Engine (Cambridge Univ. Press); Peabody's Tables of Properties of Steam (Wiley).

18. Summer Term Art Classes.

Classes in Drawing, Painting and Modelling, open to both men and women students, will be held in the rooms of the Architectural Department, under the direction of Mr. Henry F. Armstrong, commencing in April and continuing until June.

The rooms will be open on week-days from 10 a.m. to 5 p.m. Students may pursue their studies in one or more of the subjects continuously every day.

Teaching and criticism will be given daily during the above hours, except on Saturdays.

I. *Freehand Drawing*:—

(*a*) In lead-pencil and in charcoal, for students preparing for, or engaged in, any branch of art work.

(*b*) In lead-pencil, for engineering and other science students.

II. *Oil Painting and Water Colour Painting.*

III. *Modelling in Clay and Casting in Plaster.*

There will also be a special course in the *Descriptive Geometry of the First Year.*

For fees see p. 31.

19. Special Lectures.

The following special lectures were given during session 1902-03:

"Notes on the design of large alternating current generators," by B. A. Behrend, Ch. Eng., Bullock Elect. Mfg. Co., Cincinnati.

"Transformer design," by K. C. Randall, Eng. Dept., Westinghouse Elect. and Mfg. Co., Pittsburg.

"Shawinigan-Montreal transmission line," by R. D. Mershon, Cons. Eng., Montreal.

A special course on "The relations between optics, electricity and magnetism," by Prof. J. Cox.

A special course on "Radio-activity in electric oscillations," by Prof. E. Rutherford.

§ XII. Laboratories.

In the Laboratories the student will be instructed in the art of conducting experiments, a sound knowledge of which is daily becoming of increasing importance in professional work.

1. Assaying Laboratory. See Mining and Metallurgical Laboratories.

2. Astronomical Observatory. See Geodetic Laboratory.

3. Cement Laboratory.—The importance of tests of the strength of mortars and cements is very great. The equipment of the laboratory for the purpose is on a complete plan, including :—

(*a*) Three one-ton tensile testing machines, representing the best English and American practice.

(*b*) One 50-ton hydraulic compressive testing machine.

(*c*) Volumenometers for determining specific gravity and for determining the carbonic acid in the raw material.

(*d*) Faija steaming apparatus for blowing tests.

(*e*) Mechanical hand and power mixers.

(*f*) Apparatus for determining standard consistency.

(*g*) Vicats' and Gilmore's needles for determining set.

(*h*) Weighing hopper, spring and other balances.

(*i*) Gun metal moulds for tension, compression and transverse test pieces, and special moulds for placing mortar into the moulds under a uniform pressure, which, together with the mechanical mixers, enable the personal errors to be eliminated.

(*j*) Sieves of 20, 30, 40, 50, 60, 70, 80, 100, 120 and 180 meshes per lineal inch for determining the fineness.

(*k*) A Boehme hammer, with all accessories.

The laboratory is also fitted with copper-lined cisterns, in which the briquettes may be submerged for any required time, and with capacious slated operating tables, bins and tin boxes for keeping the cement dry for any period.

In the Cement Testing Laboratory, researches have been made on the strength of mortars set under pressure, the effect of frost on natural and Portland cements, the effect of sugar on lime and cement mortars, the strength of lime and cement mortars and of the bricks in brick piers, the effect of fine grinding on the adhesive strength of cements, of using hot water in mixing mortars. Continued tests on the strength of concrete blocks in series are made by Fourth Year Students.

In addition to these researches, a large amount of work is done each year by the Third Year students, in investigating the specific gravity, fineness, setting properties, constancy of volume, and the tensile, comprehensive and transverse strengths of cement, both neat and with the sand.

4. Chemical Laboratories. The main lecture-theatre, extending through two storeys, is entered from the ground floor, and seats nearly 250 students. The lecture-table is supplied with coal-gas, oxygen and hydrogen, electricity, water vacuum, down-draught, etc., and can be well seen from all parts of the room.

Besides the main lecture theatre there are three smaller class rooms, accommodating from 40 to 60 students each.

The three principal laboratories have each a floor-space of about 2,400 square feet, and together have accommodation for nearly two

hundred students working at a time. They are lighted on three sides, and have ample hood space. One is intended for beginners, and the others for more advanced work, particularly in qualitative and quantitative analysis. In connection with each of the main laboratories is a balance-room, equipped with balances by several of the best makers.

Physical Chemistry is provided for in a special laboratory, nearly 30 by 40 feet, lighted from the north, and supplied with electricity, steam, vacuum pumps, etc. The equipment of this department consists of the apparatus necessary for the determination of the specific gravities of solutions, of the depression of freezing point, and the rise of boiling point, of the densities of gases and vapours. There are constant-temperature baths for accurate measurement of solubilities, Kohlrausch's apparatus for determining the electrical conductivity of solutions, and the apparatus necessary for measuring the electromotive forces generated between metals and their solutions, and in voltaic cells generally. There are also calorimeters for measuring the heat effects produced in chemical reactions. There is on the same floor an optical room furnished with refractometers for measuring the refractive indices of solutions, goniometers, polariscopes and spectroscopes. Other forms of apparatus will be added as required for research work.

Immediately adjoining the laboratory of physical chemistry is the photographic department, supplied with two dark rooms, arranged on the maze system, and provided with the necessary appliances for all ordinary photographic work, including an enlarging camera. Apparatus for micro-photography has recently been added to the equipment.

The laboratory for gas analysis has a northern exposure, and is fitted with a large tank to contain water at the temperature of the room, for use in obtaining a constant temperature in the measurement of gases. The tables are arranged for work with mercury, and the laboratory is supplied with the apparatus of Hempel, Dittmar, Orsat, Elliot and others. It contains also Fleuss, Boltwood, and Töpler pumps for producing high vacua.

The laboratory for electrolytic analysis is supplied with accumulators, thermopile, platinum electrodes, rheostats, ammeters, voltmeters, etc.

Another room has lately been equipped with electric furnaces and other appliances for electro-chemical work.

The organic department comprises a laboratory for preparations and research, a combustion room for analysis, a dark room for polariscope and saccharimeter work, and a lecture room. The laboratory is fitted with all the necessary apparatus for organic research—special hoods for work with poisonous gases, regulating ovens for digesting and drying at various temperatures, filter presses for the extraction of raw materials, and various forms of apparatus for distillation in vacuo. The dark room is equipped with polariscopes and saccharimeters for sugar work. There is a large supply of the necessary organic chemicals, which are supplied free of charge to students engaged in routine or research work in this department.

The laboratory for determinative mineralogy has places for 28 students, and is supplied with abundant materials for practical work. It adjoins the lecture-room in which the lectures in advanced mineralogy are delivered. The mineralogical department is also provided with suitable machinery, run by electricity, for use in the cutting and polishing of minerals and rocks.

The Library contains a valuable collection of the most recent English, French, and German books, and sets of various journals and transactions, including the Berichte der Deutschen Chemischen Gesellschaft, Journal für Praktische Chemie, Chemisches Centralblatt, Fresenius' Zeitschrift für Analytische Chemie, Annales de Chemie et de Physique, Journal of the Chemical Society, Chemical News, Mineralogical Magazine, Mineralogische und Petrographisiche Mittheilungen, etc. The library is open to students under such restrictions as are necessary to prevent damage or loss of books.

The rooms for allied purposes have, as far as possible, been grouped together on the same floor, and there is a hydraulic lift running from the basement to the attic. The offices and principal laboratories and supply rooms are also connected by a system of telephones. The building is practically fire-proof.

5. Electrical Laboratories.—These laboratories contain all principal types of commutating, synchronous, and induction machinery, together with ample facilities for investigating their action. The several laboratories are the Standardizing Laboratory, the Dynamo Laboratory, the High Tension Testing Room, the Photometer Room, and the laboratory for special investigation.

(*a*) The Standardizing Laboratory is equipped with four Kelvin Balances for alternating and direct current measurements, best range .025 to 600 amperes; a Kelvin standard electrostatic multicellular voltmeter, Board of Trade pattern; a Weston laboratory standard Ammeter, range with shunts 0 to 1500 amperes; a Weston Laboratory standard Voltmeter range with multipliers, 0 to 3000 volts; a Weston Laboratory standard wattmeter range 0-7500 watts; special Weston alternating current voltmeters and wattmeters; a special Elliott Potentiometer with standard cells for electromotive force and current measurement; means for measuring high and low resistances, capacity, and di-electric strength of insulating materials, etc., etc. Direct current for the Laboratory is furnished either from the service plant, from a special motor-dynamo, the voltage of which can be continuously varied from 0 to 10 volts, current capacity 300 amperes; from a 75 K.W. hour storage battery arranged in sections, or from any d.c. machine in the Dynamo Laboratory. Alternating current of several wave shapes and frequencies up to 150 periods per second, and voltages up to 200,000 is available. A special transformer having a current capacity of 800 amperes is used for alternating current ammeter calibration. For alternating current voltmeter calibration, a special regulator is provided, by which voltages from 0 to 200 can be obtained in as small steps as desired.

(*b*) The Dynamo Laboratory. This laboratory consists of two sections, one devoted to direct current work, and the other to alternating current work. The former method of driving all dynamos from an overhead line shaft and clutch pulleys has been abandoned and individual motors supplied for each machine. Each motor is provided with suitable series turns and variable shunt, the whole being connected to act with or against the shunt turns, as a compounding or differential effect is desired. The speed of the motors can be varied about 50 per cent. by field rheostat. This gives perfect control of dynamo speed. Current for operating is obtained from six independent sources of supply; one 75 K.W. direct connected unit in the service plant; 3 sets of 25 K. W. hour chloride accumulators and two city supply circuits. All dynamos and motors are mounted on strong testing benches fifteen inches high, with slotted

floor, so that any machine can be placed anywhere on the benches and secured in place. Two small travelling cranes over the benches allow machines to be easily shifted. All wiring is done in conduits under the floor, and large sectional switchboards are provided for current distribution about the laboratories. Special testing tables, permanently wired up and fitted with circuit breakers, switches, etc., facilitate the work. Twenty-five commutating machines, generators, motors, boosters, motor-generators, dynamotors, converters, closed and open coil arc machines, varying in capacity from a fraction of a kilowatt to 75 kilowatts, of many different types and makes, are provided for direct current testing. Twelve alternating current machines, including generators, synchronous motors, compensators, and synchronous converters, together with a large amount of stationery and rotary induction apparatus, are provided for alternating current work. Several of the alternating current dynamos are of the inductor type and several different shaped inductors are provided with each machine to give different wave forms. A specially arranged induction motor serves as a frequency changer. The laboratory is also provided with between eighty and ninety voltmeters, ammeters, and wattmeters of standard make, and of different ranges; condensers, rheostats, standard resistances, etc.

(*c*) High Tension Testing Room. This room is equipped with four 10 K.W., 200-50,000 volt. transformers with switch board and suitable controlling devices. The voltage can be varied in small steps by means of a Stillwell regulator inserted in the primary and by varying the field of the dynamo supplying current. A Kelvin direct reading electrostatic voltmeter, range 100-100,000 volts., gives a means of measuring high voltages directly.

(*d*) The Photometer Room. This room is equipped with standard photometric apparatus for candle power measurements on arc and incandescent lamps.

(*e*) The laboratory for special investigation adjoins the Standardizing Laboratory. Meter and transformer testing are also done in this room.

6. Geodetic Laboratory—The equipment of this laboratory consists of:—

(1) Linear instruments.

(*a*) A Rogers comparator and standard bar for investigating standards of length.
(*b*) A fifty-foot standard and comparator for standardizing steel bands, chains, tapes, rods, etc.
(*c*) A Whitworth end-measuring machine and set of standards.
(*d*) A Munro-Rogers linear dividing engine.

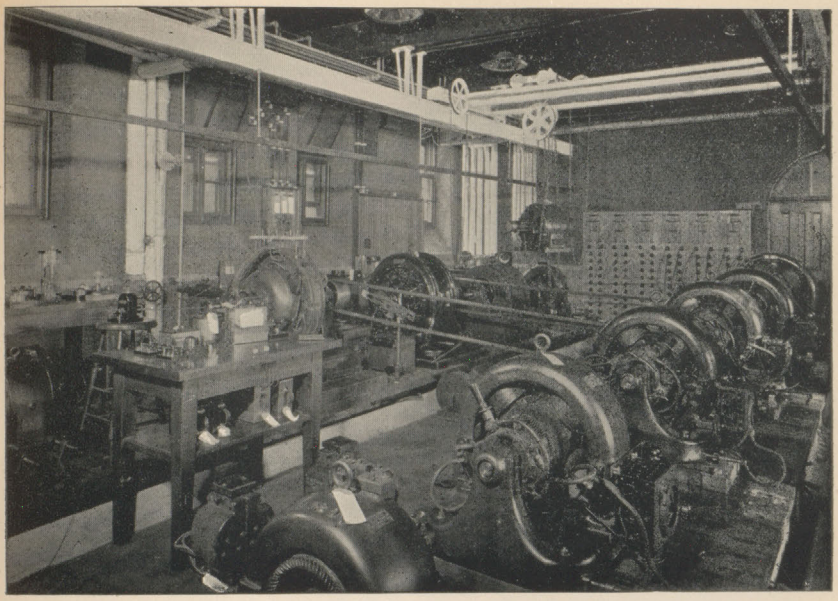
(2) Circular instruments.

(*a*) A Rogers' circular comparator and dividing engine.
(*b*) Two level triers.

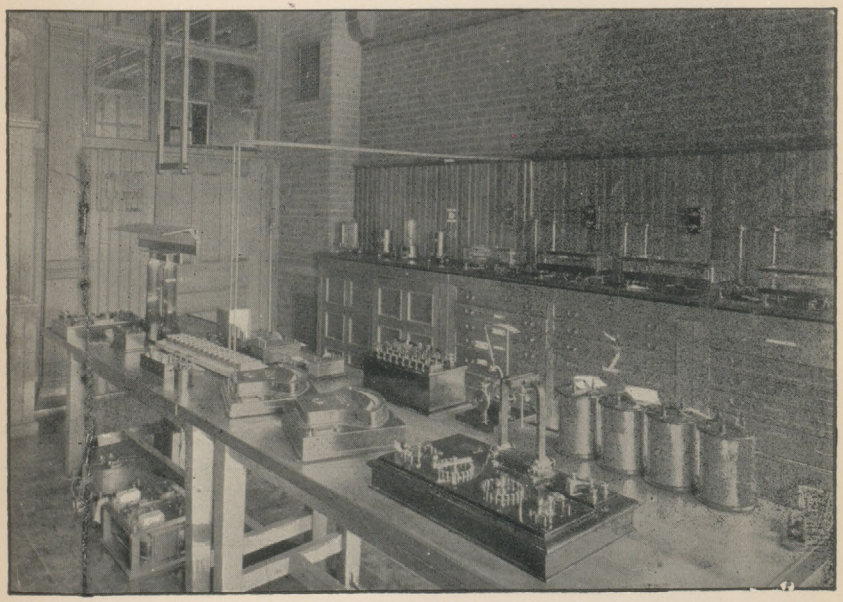
(3) Time:—

(*a*) An astronomical clock and clock circuit in connection with the observatory clocks.
(*b*) Chronometers running on mean and sidereal time.
(*c*) Chronograph.

(4) Gravity.—A portable Bessel's reversible pendulum apparatus with special pendulum clock and telescopic apparatus for observing coincidences of beats.



Alternating Current Dynamo Laboratory.



Electrical Standardizing Room.

(5) A water gauge apparatus for testing aneroid barometers.
(6) Magnetic instruments :—

(*a*) A Kew dip circle.
(*b*) A Kew filar magnetometer.

The laboratory is constructed with double walls and enclosed air spaces, and has a special heating apparatus, so that the temperature within may be brought to, and held at, any desired degree.

The ordinary course of instruction in this laboratory is described in § XI:, Art 16.

Astronomical Observatory.—The observatory equipment for the purpose of instruction in practical astronomy consists of :—

1. A Bamberg prismatic transit with zenith attachment.
2. Two astronomical transits for meridan observations. Collimating telescopes.
3. A Troughton & Simms' zenith telescope.
4. An astronomical transit in the prime vertical.
5. Sidereal and mean time clocks and chronometers.
6. Chronograph and electrical circuits by which observations and clock comparisons within or without the observatory may be made.

7. Hydraulic Laboratory.—Here the student will study practically the flow of water through orifices of various forms and sizes, through submerged openings, over weirs, through pipes, mouthpieces, etc.

The equipment of this laboratory includes :—

(*a*) A large Experimental Tank, 30 ft. in height and 25 sq. ft. in sectional area. With this tank experiments are conducted on the flow of water through orifices either free or submerged. By a simple arrangement the orifices can be rapidly interchanged without lowering the head, and with the loss of only about one pint of water. The indicating and measuring arrangements connected with the tank are exceedingly delicate and accurate, all times being automatically recorded by an electric chronograph, and valuable results have already been obtained. By means of a special connection with the city water-supply, the available head of water may be increased up to 280 ft.

(*b*) An Impact Machine, which renders it possible to measure the force with which water flowing through an orifice, nozzle, or pipe, strikes any given surface, and also the impulsive effect of the water entering the buckets of hydraulic motors.

(*c*) A Rife's Hydraulic Ram.

(*d*) A Jet Measurer specially designed for investigating the dimensions of the jet produced in the phenomena known as "the inversion of the vein." With this apparatus it is possible to determine, within .001 inch, the dimensions of a jet in any plane and at any point of the path.

(*e*) Numerous orifices, nozzles, and mouth-pieces.

(*f*) A specially designed stand-pipe, with all the necessary connections for pipes of various sizes for investigations on frictional resistance. The pressures are measured by recording gauges, etc.

(*g*) A flume about 35 feet in length, by 5 ft. in width by 3 ft. 6 ins. in depth.

(*h*) Weirs up to 5 ft. in width, and with a depth of water over the sill varying from nil to 8 inches. A weir-depthing machine, with

three adjustable heads, gives the surface depth of the stream at any three points in a transverse section. The velocity of the stream is also determined by means of a double Pitôt tube.

(*i*) Numerous hydraulic pressure-gauges.

(*j*) A mercury column 60 feet in height.

(*k*) Gauge-testing apparatus.

(*l*) Various rotary, and piston meters, and a Venturi meter.

(*m*) Apparatus for illustrating vortex motion.

(*n*) Apparatus for illustrating vortex ring motion, and for determining the critical velocity of water flowing through pipes.

(*o*) Five specially built gauging tanks with suitable indicators, each having a capacity of 800 cubic feet, for determining the critical velocity of water flowing through pipes. Also other portable tanks.

(*p*) Transmission and absorption dynamometers.

(*q*) An experimental centrifugal pump, which can be tested with varying heights of suction and discharge.

(*r*) An inward-flow turbine, a new American turbine, an outward-flow impulse turbine, a Pelton, and other motors and turbines.

(*s*) Graduated measures of various sizes; standard gallon and litre measures with glass strikes. This Laboratory is also provided with a set of pumps, specially designed for experimental work and research. They are adapted to work under all pressures up to 120 lbs. per sq. in., and at all speeds up to the highest found practicable. The set is composed of three vertical single acting plunger pumps of 7 in. diam., 18 in. stroke, driven from one shaft. They have two interchangeable valve chests, and it is arranged that both the valves and their seats may be removed and replaced by others. The pumps are also provided with a double set of continuous recording indicators designed in the laboratory and having electrical connections. With these, an accurate record of the suction and discharge valves may be obtained at any given time, all fluctuations of speed, pressure, etc., being automatically recorded.

8. Mechanical Laboratory —The equipment of this Laboratory includes :—A belt-testing machine, capable of taking a six-inch belt at 15 feet centres (the machine includes a special hydraulic dynamometer, and a friction brake, and will absorb 15 H. P.); a Thurston railway-pattern oil-tester, fitted with water cooling and heating apparatus for varying the temperature of the brasses as desired; an Engler standard viscosimeter, and other necessary apparatus for the physical testing of lubricants; a specially designed hydraulic support and fittings for carrying out experiments on the action of cutting tools in the lathe; apparatus for experiments on the efficiency of pulleys and hoisting appliances, and on the efficiency of worm and other gearing; apparatus for governor-testing.

This Laboratory is used in connection with the courses in Mechanical Engineering subjects.

9. Metallurgical and Assaying Laboratories —These consist of a large furnace room of 2,200 sq. feet for metallurgical operations, a furnace room for assaying of 1,300 sq. feet, a balance room, small analytical laboratory and parts of other rooms which are utilized for pyrometric and photo-microscopic work. The furnace room is fitted with a water-jacket blast-furnace, 24 inches inside diameter, for smelting lead and copper ores ; also a hand reverberatory furnace for roasting ores, having a hearth 14 ft. by 6 ft., a Brückner roasting furnace and an English cupellation furnace.

It has also a large lead-lined chlorination-barrel for high pressures, with filter press, air pump, etc.

The furnace room adjoins the milling and ore dressing room (see below) and ores which have been crushed and dressed can easily be conveyed into the furnace room for roasting, smelting or leaching treatments.

In addition to this comparatively large scale plant apparatus is being provided to enable the students to study in detail the more important metallurgical operations using quantities of ore or metallurgical products of usually not more than a few pounds in weight. With such appliances the work of the student can be of a more individual character than is generally possible with large scale plant, and the reactions which occur can be more easily and exactly studied.

For the purpose of small scale work there is a large crucible furnace which can be used with either natural or forced draught, a large gas furnace which can be used either as an oven furnace or a muffle furnace, and a number of small muffle and crucible furnaces in the assaying laboratory.

In the autumn of 1901 the students erected a model brick blast furnace, and used it successfully for smelting copper ores. A Roots blower has been provided for the blast furnaces, and connections for supplying forced draft have been made to the gas and reverberatory furnaces. Electric furnaces are being constructed for carrying on operations at very high temperature, and there is a low voltage moto dynamo and storage battery for electrolytic work. Leaching operations on a small scale are conducted in stoppered bottles which can be agitated by machinery.

A powerful hydraulic press and a piece of apparatus for compressing gases by hydraulic power are available for experiments that have to be conducted under great pressure.

The Assaying Laboratory is equipped with a large soft coal assay furnace, and with a number of small muffle and crucible furnaces fired with coke ; the large gas muffle furnace in the furnace room is also available for assaying purposes, and there is a small muffle furnace and a crucible furnace fired by gasoline.

Adjoining the assaying laboratory, is the balance room and a small laboratory for chemical work.

In another room are a number of electrical pyrometers of both the Le Chatelier and Callendar type, and a micro-photographic outfit for recording the microscopic structure of metals and alloys. A polishing machine, worked by power, has been installed to prepare the specimens for examination.

The courses of instruction in these laboratories are described in § XI, 11.

10. Mining and Ore-Dressing Laboratories.—The Department of Mining Engineering has one large laboratory for ore-dressing and a number of rooms of moderate size equipped for use as special laboratories, offices, lecture room, dark room, machine shop, etc. The effective floor space is about 6,600 square feet, in addition to which the departmental store rooms, ore bins ,etc., have an area of 1,000 feet.

The ore-dressing laboratory proper has about 4,200 feet of floor space and is 25 feet high in the centre.

It is equipped with two classes of apparatus. First, a large number of pieces especially designed for individual work on a small scale. Many of these are for elementary investigations and demonstrations of a theoretical nature, others are small scale reproduc-

tions of typical ore-dressing and milling machines. Second, a complete plant of standard apparatus for crushing, sampling, milling, concentrating and coal washing. The apparatus last mentioned has been chosen from the best designs in common use and each important class of ore-dressing machinery is represented by two or more different types in order that comparative tests may be made. Each machine is so arranged that it may be used, tested and cleaned up independently, but when expedient, a number of machines can be connected by automatic conveyors and thus complete working plants of many kinds can be improvised, each of sufficient capacity to test large lots of material under approximately working conditions.

The chief pieces of apparatus in the laboratory are rock-breakers of four kinds, Blake, Dodge, Comet and Sturtevant, for coarse crushing; Stamp mills of 600 and 950 lbs., respectively, for the fine crushing and amalgamating of gold ores; Huntingdon centrifugal roller mill, for crushing and amalgamating; high speed steel rolls for fine crushing; Gates' grinder for preparing samples, and a ball mill for extremely fine grinding.

Following these there is a Bridgman automatic sampler and a series of trommels and hand and power shaking screens for sizing the crushed ores; two specially designed jigs of two and four compartments, with adjustable eccentric, cam and slide mechanisms, a pneumatic jig, and several small hand and power jigs for coarse concentration; revolving, bumping and stationary glass tables; Frue vanner, Wilfley table, etc., for separating valuable minerals contained in fine sands and slimes; plates, pans, and barrels for amalgamating gold and silver ores; vats and other apparatus for cyaniding, chlorinating and other leaching processes; spitzkasten, spitzlütte, magnetic separators, coal washers, dolly tubs, and various other special pieces of ore-dressing apparatus.

An hydraulic lift and a complete series of belt and bucket elevators, feeders, samplers, etc., are provided for use in heavy continuous work. The motive power used is electricity, generated in the University power and light station, and utilized through a number of electric motors conveniently placed near the machines to be operated. The department is equipped with the most approved apparatus for electrical measurements, and is thus able to make frequent and accurate determinations of the amount of power used by each machine, and for any especial condition of use.

In addition to the main laboratory there are excellent facilities for advanced and research work—including a thoroughly equipped analytic and assay laboratory and a photographic room. The department possesses an excellent Fuess petrographical microscope, a good set of weighing and measuring devices, and a number of pieces of special apparatus for advanced theoretical investigation.

The courses of instruction in these laboratories are described in XI., 14.

11. Petrographical Laboratory.—The Petrographical Laboratory, containing the chief rock collection of the University, is situated in the Chemistry and Mining building. It is arranged for the use of students in the Mining Course as well as for those desiring to take advanced work, and is provided with a number of petrographical microscopes by Seibert, Crouch, and Fuess as well as with models, sets of thin sections, electro-magnets, heavy solutions, etc., for petrographical work.

A collection of typical rocks has been especially prepared for the use of students, and a complete equipment for cutting, grinding,

and polishing rocks, has been installed, which runs by electric power and gives excellent facilities for the preparation of thin sections for microscopic use.

For advanced work and petrographical investigation Dr. Adams' extensive private collection of rocks and thin sections is available for purposes of study and comparison.

12. Physical Laboratory.—The equipment of the Macdonald Laboratories comprises: (1) apparatus for illustrating lectures; (2) simple forms of the principal instruments for use by the students in practical work; (3) the most recent types of all the important instruments for exact measurement, to be used in connection with special work and research.

The basement contains the cellars, furnaces, and janitor's department at the west end of the building. The machine room—containing a small gas engine and dynamo, which are fitted for testing, but can also be used for light and power, a motor-alternator and a motor-dynamo—is situated at the extreme western corner of the basement so as to be as far removed as possible from the delicate magnetic and electrical instruments. Here is also the switch-board for controlling the various circuits for supplying direct or alternating current to different parts of the building. The Accumulator Room contains a few large storage cells, charged by the motor-dynamo, which are fitted with a suitable series-parallel arrangement, and with rheostats for obtaining and controlling large currents up to 4,000 amperes for testing ammeters and low resistances, etc.

The Magnetic Laboratory contains magnetic instruments and variometers of different patterns, and, also a duplicate of the B. A. Electro-dynamometer, which has been completely remodelled and set up with great care for absolute measurement of current. The laboratory, on the opposite side of the basement, contains a very fine Lorenz apparatus for the absolute measurement of resistance, constructed under the supervision of Prof. Viriamu Jones. It also contains a set of Ewing Seismographs and a pair of Darwin recording mirrors for measuring small movements of the soil.

There is a constant temperature room, surrounded by double walls, which contains a Standard Riefflер clock, and is fitted for comparator work.

The ground floor contains at the western corner a small machine shop, fitted with a milling machine and suitable lathes and tools driven by electric motors, and such appliances as are required for the making and repairing of the instruments, for which the services of a mechanical assistant are retained. There is also a store room for glass, chemicals, and cleaning materials, and extensive lockers and lavatories for the use of the students.

The main Electrical Laboratory is a room 60 feet by 40, and is fitted with a number of brick piers, which come up through the floor, and rest on independent foundations, in addition to the usual slate shelves round the walls. This room contains a large number of electrometers, galvanometers, potentiom ters and other testing instruments of various patterns, and adapted for different uses. It connects with a smaller room at the side, in which are kept the resistance boxes and standards, and also the capacity standards. A small research laboratory adjoining the electrical laboratory, is fitted up for the study of electrical discharge in high vacua and for work with Röntgen and uranium radiation, and with ultra-violet light.

The first floor contains the main Lecture Theatre, with seats for about 250 students. The lecture table is supported on separate

piers, which are independent of the floor. Complete arrangements are provided for optical projection and illustration. The Preparation Room in the rear contains many of the larger pieces of lecture apparatus, but the majority of the instruments, when not in use, are kept in suitable cases in the adjoining apparatus room. On the same floor there is the Heat Laboratory, devoted to advanced work in Thermometry, Pyrometry and Calorimetry, and also to such electrical work as involves the use of thermostats and the measurement of the effects of temperature. There are also two smaller rooms for Professors and Demonstrators.

The second floor is partly occupied by the upper half of the Lecture Theatre. There is also an Examination Room for paper work, a Mathematical Lecture Room, with a special apparatus room devoted to apparatus for illustrating Mathematical Physics, and a special Physical Library chiefly devoted to reference books and periodicals relating to Physics. A store room, lavatories, and Professors' room occupy the remainder of the flat.

The third floor contains the Elementary Laboratory, a room 60 feet square, devoted to elementary practical work in Heat, Light, and Sound, and Electricity and Magnetism. There is a Demonstrator's Room adjoining, and an optical annex devoted to experiments with lenses, galvanometers and polarimeters. Also a series of smaller optical rooms, including a photometric room, specially fitted for arc photometry, and a dark room for photographic work.

Mathematics and Dynamics.—Part of this floor, allotted to the subject of Mechanics, contains instruments for measuring length, area, volume, time, mass; Atwood machines and a Galileo Inclined Plane for the study of the Laws of Motion; Willis Apparatus for experiments in Statics and Friction on a large scale; Simple, Kater and Ballistic Pendulums; and torsion and rotation apparatus for determining moments of inertia. The practical work in this section is arranged to run parallel with and illustrate the lectures in Dynamics delivered in the first year, and also those in the second year of the Faculty of Arts.

13. Testing Laboratories.—The principal experiments carried out in these will relate to the elasticity and strength of materials, friction, the theory of structures, the accuracy of springs, gauges, dynamometers, etc. The equipment of this laboratory includes :—

(*a*) A Wicksteed 100-ton and an Emery 50-ton machine for testing the tensile, compressive and transverse strength of the several materials of construction. To the former has been added a specially designed arrangement, by which the transverse strength of girders and beams up to 26 ft. in length can be determined. These machines are provided with the holders required for the various kinds of tests, and new holders have also been specially designed and made in the laboratory for investigating the tensile and shearing strength of timber for wire rope and belt tests, etc. Numerous attachments have also been made to the machines, which have already increased their efficiency. The most recent addition is a double-bearing support for transverse testing.

(*b*) An Impact Machine, with a drop of 30 ft., and with gearing which will enable specimens to be rotated at any required speed, and the blows to be repeated at any required intervals. By means of a revolving drum, a continuous and accurate record of the deflections of the specimens under the blows can be obtained.

(*c*) An Unwin Torsion Machine with a specially designed angle-measurer, by which the amount of the torsion can be measured with extreme accuracy.

(*d*) An Accumulator, furnishing a pressure of 3,600 lbs. per square inch, which is trasmitted to the several testing machines, and ensures a perfectly steady application of stress, an impossibility when any form of pump is substituted for an Accumulator.

(*e*) A Blake and a Worthington Steam Pump, designed to work against a pressure of 3,600 lbs. per square inch. The Accumulator may be actuated by either of the pumps, and, if at any time it is desirable to do so, either of the pumps may be employed to actuate the testing machine direct. When in operation the work of the pump and the accumulator is automatic.

(*f*) Extensometers of the Ewing, Unwin, Martens, Marshall and other types. The extensometer equipment has recently been enriched by seven sets of improved extensometer apparatus designed and made in the laboratory.

(*g*) Portable cathetometers, and also a large cathetometer specially designed and constructed for the determination of the extensions, compressions and deflections of the specimens under stress in the testing machines.

(*h*) An automatic electric motor pump for actuating the Accumulator; also various electric motors for working the several machines.

(*i*) A drying oven for beams up to 26 ft. in length. The hot air in this oven is kept in circulation by means of a fan driven by an electric motor.

(*j*) Numerous gauges, amongst which may be specially noticed an Emery pressure gauge, graduated in single lbs. up to 2,500 lbs. per square inch. All of the testing machines are on the same pressure circuit, and are connected with the Emery gauge and also other standard gauges, including recording gauges. This arrangement provides a practically perfect means of checking the accuracy of the testing.

(*k*) Special apparatus and recording gauge for the testing of hose, etc.

(*l*) Dynamometers for measuring the strength of textile fabrics, the holding pover of nails, etc.

(*m*) Apparatus for determining the elasticity of long wires.

(*n*) Apparatus for determining the hardness of materials of construction.

(*o*) Zeiss and other Microscopes.

(*p*) Delicate chemical and other balances. A very important part of the equipment is the Oertling balance, capable of indicating with extreme accuracy weights of from .00001 lb. up to 125 lbs.

(*q*) Apparatus for the microscopic study of metals and for microscope photography.

(*r*) Micrometers of all kinds.

(*s*) A transverse bending machine, which is adapted for loads up to 3000 lbs. and for beams of 10 ft. span.

(*t*) Small beam testing machines, used to illustrate the laws of the bending of beams, both when the ends are free and when they are fixed.

(*u*) Two small tension machines, in which experiments are made on metals, the strains being within the elastic limit.

(*v*) Apparatus with experiments for long wires, adapted for experiments on wires 60 ft. in length.

(*w*) A lever machine of experiments on alternate twisting.

(*x*) A testing machine for breaking tests on wires.

(*y*) A powerful hydraulic press for compression tests on metals, cements, stone and similar materials.

(*z*) Apparatus for measuring strains of compression.

The following new apparatus is being installed:—A Riehle testing machine of 60,000 lbs. capacity; a testing machine for applying bending and torsion simultaneously; a Fairbanks' scales.

14. Thermodynamic Laboratory.—The Thermodynamic Laboratory is furnished with an experimental steam engine of 120 I. H. P., specially designed for investigating the behaviour of steam under various conditions; the cylinders are 6 1-2 inches, 9 inches, 13 inches, and 18 inches in diameter, and the stroke of all the pistons is 15 inches. The cylinders can be so connected as to allow of working as a simple, compound, triple, or quadruple expansion engine, either condensing or non-condensing, and with any desired rate of expansion. The jackets are so fitted as to permit of measuring independently the water condensed in the cover, barrel, or bottom jacket of each cylinder, and the engine can be worked with any desired initial pressure up to 200 lbs. per square inch. The measurements of heat are made by means of large tanks, which receive the cooling water and the condensed steam. There is an independent surface condenser and air pump. Two hydraulic absorption brakes and an alternative friction brake serve to measure the mechanical power developed.

The Laboratory also contains the following machinery:—

A Robb automatic cut-off engine, having a cylinder 10 1-2 inches in diameter by 12 inches stroke. This engine is specially fitted up for the measurement of cylinder temperatures, and can be run at speeds up to 300 revolutions per minute.

An automatic high speed engine by Macintosh & Seymour, having a cylinder 12 inches diameter by 12 1-2 inches stroke. Automatic recording apparatus, registering the load on the brake of this engine, has been constructed and fitted up during the past session.

A hot-air engine built by Woodbury Merrill of Ticonderoga.

An Atkinson "Cycle" Gas engine, having a cylinder 7 inches diameter by 8 inches stroke, and indicating 6 H. P.

An Otto gas engine (built in the workshops of the Department), having a cylinder 8 1-2 inches diameter by 12 inches stroke, and indicating 12 H. P.

A "Dake" steam engine of 4 H. P.

A two stage air compressor taking 40 H P., and having cylinders 10 inches and 17 inches in diameter, by 15 inches stroke. The compressor delivers its air into reservoirs placed beneath the floor of the machine shop, and is provided with an intercooler whose capacity can be varied as desired.

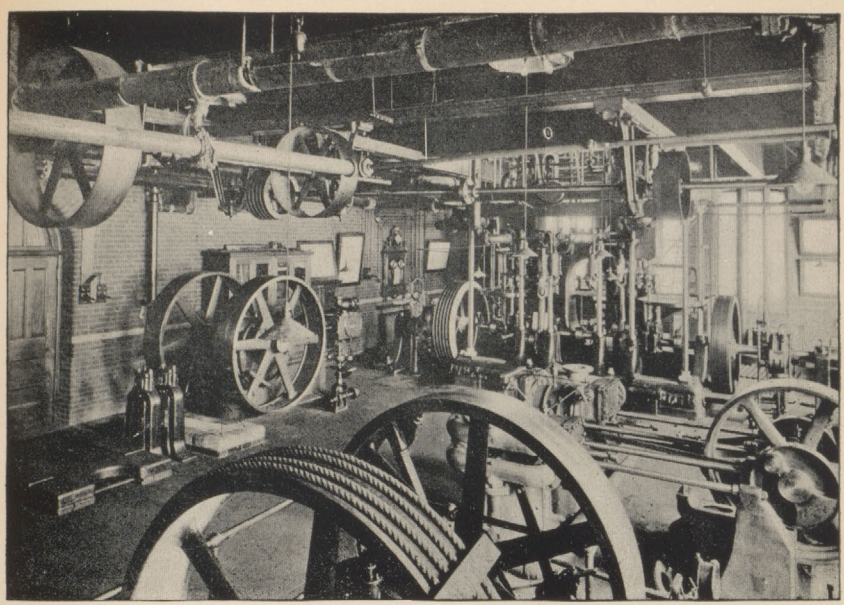
A high speed horizontal engine having a cylinder 6 inches diameter by 9 inches stroke, and operated by compressed air.

A gas-fired preheater for the above engine.

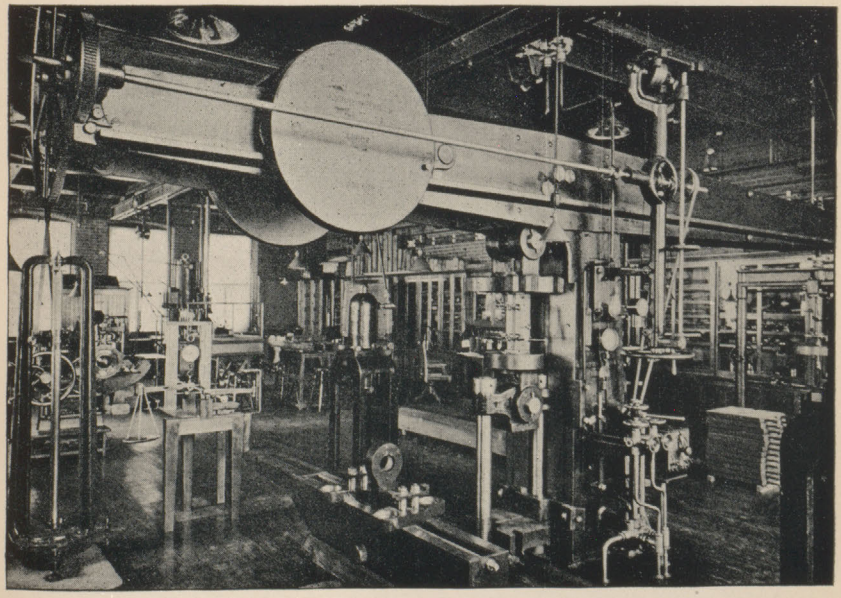
A standard 9 1-2 inch Westinghouse air brake pump, fitted for testing and for supplying compressed air for experimental and other purposes.

A non-rotative Blake steam pump, having steam and water cylinders, 4½ and 2¾ inches diameter and 4½ inches stroke.

The smaller apparatus belonging to the laboratory includes the necessary equipment of weighing machines, brakes, calorimeters, ther-



Thermodynamic Laboratory.



An Engineering Testing Laboratory.

mometers, gauges, pyrometers, fuel testers, indicators, planimeters, and a Moscrop recorder.

The boiler installation of the Engineering Building supplies steam for heating and power purposes, and is so arranged as to be available for experimental work in connection with the Thermodynamic Laboratory. It comprises boilers of five distinct types as follows:—

One Cornish boiler, for heating service, rated at 50 H. P.
One locomotive boiler, Belpaire type, 100 H. P.
One internally fired tubular boiler, 120 H. P.
Two Babcock-Wilcox water-tube boilers, each 60 H. P.
One Yarrow water-tube boiler, fitted in a closed stokehold, for working under forced draft, rated at 150 H. P.

These boilers are provided with the necessary tanks, weighing-machines and apparatus for carrying out evaporative tests.

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§ XIII. Museums.

The Peter Redpath Museum.— The Peter Redpath Museum contains large and valuable collections in Botany, Zoology, Mineralogy and Geology, arranged in such a manner as to facilitate the work in these departments. Students have access to this Museum, in connection with their attendance on the classes in Arts in the subjects above named, and also by tickets which can be obtained on application.

Engineering Museum.— This Museum occupies the third storey of the Engineering Building, and amongst other apparatus, contains the Reuleaux collection of kinematic models, presented by Sir William Macdonald, and pronounced by Professor Reuleaux to be the finest and most complete collection in America.

Architectural Equipment.— The Architectural Department has been endowed by Sir Wm. Macdonald, the founder, with a very thorough equipment for practical purposes of instruction. In the Museum of the Engineering Building is included a large collection of casts both of architectural detail and ornament (illustrative of the historical development of the various styles) and of architectural and figure sculpture. The freehand-drawing classes for architectural students, as also the classes of architectural drawing and design, are conducted in this portion of the building.

A special architectural department has been added to the University Library; text-books and other works have been added to the Faculty Library. A collection of photographs is placed in the architectural room for the use of students in the class of design, in addition to a select reference library of illustrated works. Diagrams and lantern slides are used in illustration of the historical courses; models and specimens of materials and fittings in those on Building Construction, Sanitation, etc.

XIV. Workshops and Workshop Instruction.

The Workshops, erected on the Thomas Workman Endowment, have a total floor area of more than 25,000 square feet. The course in shopwork is intended to afford some preparation for that study of workshop practice on a commercial scale which every engineer has to carry out for himself. With this end in view, the student works in the various shops of the department, and completes in each a series of practical exercises. He thus obtains some knowledge of the nature and properties of the various materials he employs; he becomes familiar with the use and care of the more important hand and machine tools; and he acquires some manual skill.

The instruction thus obtained must, however, be continued and supplemented. For this purpose students are expected to spend the greater portion of each long vacation in gaining practical experience in some enginering workshops outside the University.

Throughout the course, advanced students are as far as possible entrusted with the construction and erection of machinery and apparatus which afterwards form part of the equipment of the department. An air-compressor, a boring bar, a belt-testing machine, and a duplex feed pump, are examples of the work which has been done in this manner. Such students are also encouraged to see and assist in the repairs required by the engines, boilers and machine tools in the engineering building.

Equipment.—The Carpenter's Shop and the Pattern Shop contain thirty-eight carpenters' and pattern-makers' benches complete with the necessary sets of hand tools, twenty-two wood-turning lathes with their turning tools, a large pattern-makers' lathe for faceplate work, one circular saw bench, a jig saw, a band saw, two wood trimmers, a surface planer, a thickness planer, a mortising machine, a saw-sharpener, and one universal wood-working machine.

The Smith Shop is provided with sixteen Sturtevant forges which are power-driven and are connected with an exhaust fan. There is a power hammer, and the necessary equipment of anvils, swage blocks, sets, flatteners and other tools. Provision is made for instruction in soldering and brazing, and for an elementary course in ornamental wrought iron work in connection with the architectural course.

The Foundry has benches, tools, and apparatus for bench and floor moulding and core-making, and is able to accommodate twenty students. A gas-fired brass melting furnace, a cupola for melting iron, and the necessary core-ovens and core-benches give facilities for undertaking iron foundry work in green and dry sand, and for brass moulding. The shop is served by a hand travelling crane of one ton capacity.

The Machine Shop has twelve 18-inch engine lathes, one 18-inch turret lathe fitted for stud and screw making, one 27-inch engine lathe, one 72-inch surfacing lathe, one brass-finishing lathe, one 36-inch vertical drilling machine with compound table, one universal milling machine with vertical milling attachment and dividing headstock, one planer capable of taking work up to 24″ × 24″ × 5 ft., one 9-inch slotting machine, one 16-inch shaper, one universal grinding machine, a centering machine, a cutter grinder, a tool grinder and a buffing and emery grinding machine. There are vise benches for eighteen students, with the necessary hand-tools, and a marking-off table. The tool-room contains a full equipment of drills, reamers, milling cutters, and accessories, gauges, callipers, and other measuring instruments.

All the machinery in the Workshops is driven electrically by motors taking power from the generating station in the Macdonald Building.

Courses of Instruction.

INSTRUCTORS IN SHOPWORK.

CARPENTER'S SHOP AND PATTERN SHOP.....G. WOOLEY
SMITH SHOP.....
FOUNDRY.....H. LANE
MACHINE SHOP.....J. F. MACOUN

The work of the various shops is carried out under the direc- of the Professor of Mechanical Engineering. The following are the subjects of instruction:—

Carpentry and Joiner Work.—Sharpening and care of wood-working tools. Sawing, planing and paring to size. Preparation of flat surfaces, parallel strips, and rectangular blocks. Construction of the principal joints employed in carpentry and joiner work, such as end and middle lap joints, end and middle mortise and tenon joints, mitres, and dado and sash joints. Dovetailing, scarfing. Joints used in roof and girder work. Wood-turning, use of wood-turning tools.

Pattern making.—Use of pattern-makers' tools. Elements of pattern-making, allowances to be made for draught and for contraction in moulding and casting, use of contraction rule. Preparation of prints and plain core-boxes. Exercises in paring and turning. Construction of patterns and core boxes for pipes, flanges, elbows, tees, and valves. More difficult exercises in pattern-making, including built-up patterns and face-plate work. Gear and wheel patterns.

Smith-work.—The forge and its tools. Use and care of smiths' tools. Management of fire. Use of anvil and swage-block. Drawing taper, square and parallel work. Bending, upsetting, twisting, punching, and cutting. Welding and scarfing. Forging, hardening, and tempering tools for forge and machine work. Tempering drills, dies, taps, and springs.

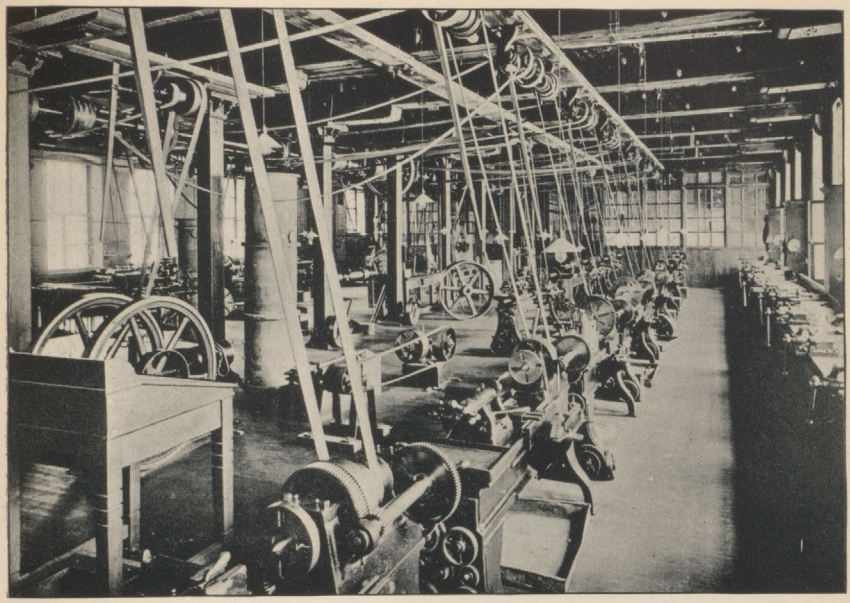
Foundry-work.—Moulders' tools and materials used in foundry work. The cupola. The brass furnace. Preparation of moulding sand. Boxes and flasks. Core-making. Use of core-irons. Bench moulding. Blackening, coring and finishing moulds. Vents, gates and risers. Special methods required in brass moulding. Floor moulding. Open sand work. Advanced examples of moulders' work. Melting and pouring metal. Mixtures for iron and brass casting.

Machine-shop Work.—Exercises in chipping. Preparation of flat surfaces. Filing to straight edge and surface plate. Scraping. Screwing and tapping. Use of scribing block and surface gauge. Marking off work for lathes and other machines. Turning and boring cylindrical work to gauge. Surfacing. Screw-cutting and preparation of screw-cutting tools. Use of turret lathe. Taper turning. Machining flat and curved surfaces on the planing and shaping machines. Plain and circular milling with vertical and horizontal spindles; gear-cutting. Cutter-grinding. Drilling and boring. Use of jigs. Grinding flat and cylindrical surfaces. Cutting tools for hand and machine; their cutting angles and speeds. Dressing and grinding tools.

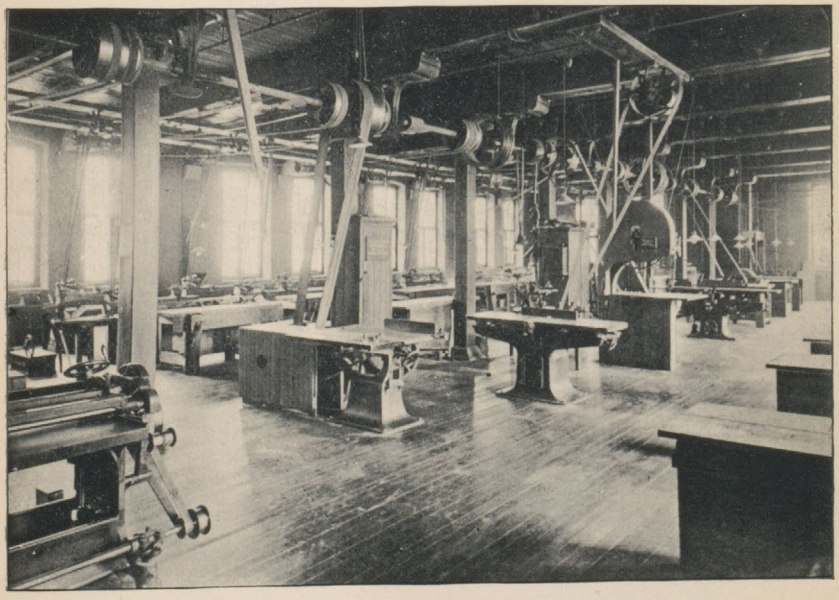
The following work has recently been completed or is now in progress in the Workshops of Department of Mechanical Engineering:—

72 in. surfacing and boring lathe, and compound rest for same.

New rocking grate for locomotive boiler.



Machine Shop.



Pattern Shop.

Apparatus for experimenting on efficiency of worm gearing.
Set of cast iron gauges for machine shop.
Model to illustrate engine balancing.
Three surface condensers.
One 1,000 lbs. coal car for boiler room.
Two hydraulic dynamometers.
Two draft gauges of special design.
One preheater for 6 x 9 compressed air engine.

XV. Statement of Research Work in the Laboratories—1902-03.

On the back water produced by diminishing the width of a weir. Prof. H. T. Bovey (in progress).

On the pressures produced by sand on vertical and inclined surfaces. Prof. H. T. Bovey (in progress).

An experimental determination of the variation of the critical velocity of water with temperature. Dr. E. G. Coker and S. B Clement. Phil. Trans., 1903.

A flexible joint for securing tubes in vessels under pressure. Dr. E. G. Coker. Phys. Review, 1903.

On the loss of head due to sudden changes of section in pipes conveying water. Dr. E. G. Coker and K. M. Cameron (in progress).

On the microscopic structure of cements. Dr. E. G. Coker and K. M. Cameron (in progress).

On the loss from unresisted expansion in the intermediate cylinder of a triple expansion steam engine. Prof. R. J. Durley.

On the co-efficient of discharge for air passing through orifices in thin plates under small differences of pressure. Prof. R. J. Durley.

On the efficiency of Hindley worm-gearing. Prof. R. J. Durley.

A new curent wave meter. Prof. R. B. Owens. Trans. Amer. Inst. Elect. Engs., 1902.

Determination of alternator characteristics. L. A. Herdt. Trans. Amer. Inst. Elect. Engs., 1902.

Relation of temperature and current in electrical conductors under different conditions. H. A. Burson.

An electric accelerometer. Prof. R. B. Owens.

An electrical indicating transmission dynamometer. Prof. R. B. Owens.

On the performance of a repulsion motor. Prof. R. B. Owens and L. A. Herdt.

Tests on induction generators. L. A. Herdt.

On the overheating and burning of steel. Prof. A. Stansfield.

The microscopic structure of overheated steel. Prof. A. Stansfield and Howells Frechette.

On the coking of coal. Prof. A. Stansfield and C. A. Rowlands.

On the free fall of spheres in still water. Dr. J. B. Porter and C. V. Corless.

On the relation of the power consumed in crushing rock to the size and surface of the fragments produced. Dr. Porter and H. P. DePencier.

On the concentration of certain crystalline magnetites by hydraulic vs. magnetic methods. Dr. Porter.

On the rate of flow of films of water of different depths on inclined planes. T. F. Robertson.

On sizing vs. classifying as a preparation for concentration on tables. S. H. Boright.

On pneumatic jigging methods as applied to mixtures of minerals of different densities. A. S. B. Lucas.

On the Elmore Oil process as applied to certain ores. O. Hall.

XVI. Donations During Session 1902-03.

One Riehle testing machine, 60,000 lbs. capacity, from R. G. Reid, Esq.

One steam engine indicator, from the Star Brass Mfg. Co. (Boston.)

One Daft electric light dynamo, from the Northern Electric & Mfg. Co. (Montreal).

One 5 H. P. induction motor, from the Ampere Electric Mfg. Co. (Montreal), and one steel beam.

Two steel castings, from the Canada Switch and Spring Company.

Weston laboratory standard wattmeter and voltmeter. Anonymous.

High tension insulators and pole head, from the Shawinigan Light and Power Company.

One 7.5 k.w. and 15 k.w. transformer, from the Westinghouse Electric and Mfg. Company, (Pittsburg).

One standard 50 mil-amp. capacity megohm and portable wattmeter, from Anonymous.

Seventeen high tension reactive coils, from the Atmospheric Product Co.

Rubber insulated wire for research work, from the Okonite Company.

Lots of ore, coal, etc., from the Intercolonial Copper Co., Dorchester, N.B.; the Dominion Iron and Steel Co., Sydney, C.B.; the London and B.C. Gold Fields Co., Ltd., Nelson, B.C., etc.

Apparatus from the Montreal Rolling Mills.

Books from Can. Rand Drill Co., Dr. Adams, Dr. Porter, Prof. Durley.

Number of framed photographs, from the Grand Trunk Railway Company.

Photographs, drawings, blue prints, reports, specifications, etc., from the Canadian Pacific Railway Co., the Dominion Coal Co. and the Dominion Iron and Steel Co. (Sydney, C.B.), the General Electric Co. (Schnectady), the Westinghouse Elect. and Mfg. Co. (Pittsburg), the Bullock Elect, and Mfg. Co. (Cincinnati), The Crocker-Wheeler Elect, and Mfg. Co. (Ampere), Canadian General Elect. Co. (Toronto), U.S. Navy Department, Bureau of Construction and Bureau of Steam Engineering, Westinghouse Air Brake Co. (Pittsburg), Pennsylvania Steel Co. (Steelton, Pa.), American Bridge Co. (per C. Schneider, Esq.), Grand Trunk Railway Co., E. Deville, Esq. (Ottawa), F. H. McGuigan, Esq. (G.T.R.), W. D. Robb, Esq. (G.T.R.), E. A. Williams, Esq. (C.P.R.), W. B. MacKenzie, Esq. (I.C.R.), G. A. Mountain, Esq. (C.A.R.), C. B. Smith, Esq., etc., etc.

Publications:—Inst. C. E. (London); Inst. Mech. Eng. (London); Inst. of Engs. and Shipbuilders, in Scotland; Society of Engineers (London); Liverpool Engineering Society; Amer. Inst. C. E.; Amer. Inst. Mech. Engs.; Can. Soc. C. E.; Cassier's Magazine Company, Am. Inst. Mining Engrs.; The Inst. of Mining and Metallurgy (London); Australasian Inst. Mining Engrs. (Melbourne); The Geological Survey of Canada, etc., etc.

FACULTY OF APPLIED SCIENCE—TIME TABLE—FIRST AND SECOND YEARS.

Years.	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
First Year.	9	Mathematics.	Mathematics.	Mathematics.	Mathematics.	Mathematics.	Shopwork (*C*)
	10	Mathematics.	Mathematics.	Mathematics.	Mathematics.	Mathematics.	Do
	11	Shopwork, (S. & F.)	English.	Lettering.	English.	Geom. Drawing (*a.*) Lettering (b.)	Do
	12	Shopwork, (S. & F.)	Physics.	Lettering.	Physics.	Geom. Drawing (*a.*) Lettering (*b.*)	Do
	2 to 5	Physical Lab. *B.* Shopwork. (S. & F.)	*A.* Physical Lab.	Desc. Geometry.	*A.* Shopwork, (S. & F.) *B.* Physical Lab.	Freehand Drawing.	
Second Year.	9	Mathematics, 1, 2, 3, 4, 5, 6, 7.	Mathematics, 1, 2, 3, 4, 5, 6, 7.	Mathematics, 1, 2, 3, 4, 5, 6, 7.	Mathematics, 1, 2, 3, 4, 5, 6, 7.	Freehand Drawing, 1. Surveying, 3, 7.	Archt. Drawing, 1. Shopwork, (S. & F.) 4, 5, A (M.) 3, 6, 7. Kinematics, 4, 5, B
	10	Experimental Physics, 1, 2, 3, 4, 5, 6, 7.	Chemistry, 2, 6. Surveying, 3, 7.	Mathematics. 1, 2, 3, 4, 5, 6, 7.	Experimental Physics, 1, 2, 3, 4, 5, 6, 7.	Freehand Drawing, 1.	Do
	11	Archt. Drawing, 3. Chem. Lab., 2, 4, 5, 6, 7. Freehand Drawing, 1.	Chemistry, 1, 2, 3, 4, 5, 6, 7.	Chemistry. 2, 6 Hist. of Archt., 1. Kinematics, 4, 5. Surveying. 3. 7.	Chemical Lab., 2, 6. Hist. of Archt., 1. Kinematics, 4, 5, A Shopwork (S. & F.) B	Mathematics, 1 2, 3, 4, 5, 6, 7.	Do
	12	Archt. Drawing, 3. Chemical Lab, 2.4,5,6,7. Freehand Drawing, 1.	Elem. of Archt., 1, 3.	Chemistry, 1, 2, 3, 4, 5, 6, 7.	Kinematics, 4, 5, A Shopwork, (S. & F.) 4, 5, B	Chemistry, 1, 2, 3, 4, 5, 6 7.	Do
	2 to 5	Chem. Lab. 1, 2, 3. Physical Lab., 4. 6, 7. Shopwork (M.) 5.	Desc. Geometry, 1, 3, 4, 5, 6, 7.	Chemical Lab., 2, 6. Mapping, 3, 7. Mechl. Drawing, 5. Shopwork, (S.) 1; (M) 4.	Archt. Drawing, 1. Chemical Lab., 2. Mapping, 3. Mechl. Drawing, 4, 5,6, 7	Chemical Lab., 6, 7. Physical Lab., 1, 2, 3, 4, 5.	

(*A*) One-half of class. (*B*) Other half of class. (*a*) First Term. (*b*) Second Term. (*c*) After Nov. 1st. 1. Architectural Students. 2. Chemistry Students. 3. Civil Engineering Students. 4. Electrical Engineering Students. 5. Mechanical Engineering Students. 6. Metallurgical Students. 7. Mining Engineering Students. Shopwork :—*S.* Smithy ; *F.* Foundry ; *C.* Carpenter Shop ; *M.* Machine Shop.

The Chemical Laboratories are open to Second, Third and Fourth Year classes daily (Saturday excepted) from 9 a.m. to 5 p.m.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Hist. of Archt., 1. Geology, 2, 3, 6, 7.	Art History, 1. D. C. Machy., 4, 5. Mineralogy, 2, 6, 7. Roads and Canals, 3.	Dyn. of Mach, 4, 5. Freehand Drawing, 1. Geology, 2, 3, 6, 7.	Hist. of Archt., 1. D. C. Machy, 4. 5. Desc. Geom., 3. Mineralogy, 2, 6, 7.	Mathematics, 3, 4, 5, 7 and 1.** Surveying, 1.*	Geological Excursion, (*c*) 2. 3, 6, 7. Testing Lab 1, 3, 4, 5, 6, 7.
10	Dyn. of Mach., 4, 5. Freehand Drawing, 1. Metallurgy (*a*) 2, 6, 7. Ore-dressing, (*b*), 6, 7.	Chem. Lab. 6 (*a*) 2. Elect. Meas., 4. Org. Lab. (*b*) 2. Surveying, 3, 7; 1*. Thermodyn., 5.	Chemistry 6 (*b*) 2. Freehand Drawing, 1. Mechl. Eng. Lab. 5. Shopwork (P. & M.) 4. Surveying, 3, 7.	Designing, 1. Mach. Des., 4, 5, 7. Chem. Lab. 2, 6.	Geology, 2, 3, 6, 7. Shopwork (F.) (*b*) 5.	Do.
11	Chemistry, (*a*) 6, 7. Freehand Drawing, 1. Org. Chem. (*b*) 2. Thermodynamics, 5. Transportation, (*b*) 7. Chem. Lab. (*b*) 6. Municipal Eng., 3.	Chem. Lab. 6 (*a*) 2. Org. Lab. (*b*) 2. Theory of Structures, 1, 3, 4, 5, 7.	Mechl. Eng. Lab., 5. Metallurgy, (*a*) 2, 6, 7. Ore Dressing, (*b*), 6, 7. Shopwork (P. & M)., 4. Surveying, 1. *	Designing, 1. Machine Design, 4, 5, 7. Org. Chem. (*b*) 2. Roads and Canals, 3. Chem. Lab. 6 (*a*) 2	Chem. Lab, 26. Freehand Draw. (*b*), 1. Graphical Statics (*a*) 1, 3, 4, 5, 7. Shopwork (*b*), 5. Transportation, *b*) 7.	Do.
12	Architecture, 1. Mathematics, 3, 4, 5, 7 & 1 ** Indust. Chem. (*a*) 2, 6.	Chem. Lab. 6 (*a*) 2. Org. Lab. (*b*) 2. Theory of Structures, 1, 3, 4, 5, 7.	Chem. Lab. 2 (*a*) 6. Mechl. Eng. Lab., 5. Metallurgy (*b*), 6. Mining, 7. Shopwork, (P. & M), 4. Struct. Eng., 1, 3.	Indust Chem., 2, 6. Theory of Structures, 1, 3, 4, 5, 7.	Chem. Lab., 2 (*a*) 6. Freehand Drawing (*b*) 1. Graphical Statics (*a*) 1, 3, 4, 5, 7. Museum Wk. in Geol. (*b*) 3, 6, 7. Shopwork (*b*), 5.	Museum Work in Geology (*d* & *b*) 2, 3, 6, 7.
2 to 5	Chem. Lab. (*a*) 2. Designing, 1. Mechl. Drawing, 4, 5, 6, 7. Org. Chem. Lab. (*b*) 2.	Chem. Lab. (*a*) 2, 6. Chem. Lab. (*b*) 2 ** Designing, 1. Dyn. Lab., 4, 5. Mapping 3 (*a*) 7. Fire Assay Lab (*b*, 6, 7; 2** Ore-dress Lab. (*b*) 6, 7.	Chem. Lab., (*a*) 2, 6, 7. Mapping, 1* and 3 Chem. Lab. (*b*) 2.** Physical Lab. 4. Fire Assay Lab, (*b*) 6, 7; 2** Ore-dress Lab. (*b*) 6, 7.	Chem. Lab. 6 (*a*) 2, (*b*) 7. Desc. Geom., (*a*) 1, 3. Dyn. Lab., 4. Mapping (*a*) 7. Mechl. Drawing, 5. Modelling (*b*), 1. Railway Struct., (*b*) 3. Org. Chem. Lab. (*b*) 2.	Det. Min., 2, 6, 7. Designing, 1. Graphical Statics, 3. Physical Lab., 4. Shopwork, (P. and M.), 5. Struct. Eng. 1 & 3.	

(*a*) First Term. (*b*) Second Term. (*c*) First half of first Term. (*d*) Second half of first Term. (*f*) Second half of Second Term. 1. Architectural Students. 2. Chemistry Students. 3. Civil Engineering Students. 4. Electrical Engineering Students. 5. Mechanical Engineering Students. 6. Metallurgical Students. 7. Mining Engineering Students.

*3rd Year Architects with 2nd Civils. **Optional Course. (Shopwork; *M.* Machine Shop; *P.* Pattern Shop.

The Chemical Laboratories are open to Second, Third and Fourth Year Classes (Saturday excepted) from 9 a.m. to 5 p.m.

FACULTY OF APPLIED SCIENCE—TIME TABLE—FOURTH YEAR.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9	Electro-Chem. Lab., (*b*) 4. Freehand Drawing, (*b*) 1 Geology, (*a*) 1. Mining, 7. Thermodynamics, 5.	Art History, 1. Dyn. of Mach., 5. Mining, 7. Phys. Chem., 2, 6. Railway Eng., 3.	Designing, 3. Dyn. of Mach., (*a*) 5. Geology, (*a*) 1. Metallurgy, (*b*) 6. Mining, (*b*) 7. Mining Mach., (*a*) 6, 7. Th. of Struct., 3 & 1.** Thermodyn., (*b*) 5.	Designing 1. Hydraulic Machy., etc., 3, 4, 5, 7. Phys. Chemistry, 2, 6.	Mechl. Eng. 5; (*a*) 3, 4, 6, 7. Mining & Metall. Lab., (*b*) 6, 7. Water Colouring, (*b*) 1.	Chem. Lab., 2. Designing, (*b*) 1. Dynamo Lab., (*b*) 4. Geodetic Lab., 3. Geology (*a*) 1. Min. & Metall. Lab., 6, 7. Shopwork (*M.*) 5.
10	Elect. Chem. Lab. (*b*) 4. Freehand Drawing 1. Hydraulics, 3, 4, 5; (**a**) 7. Hydraulics } (*b*) 7 ** Metall. (*b*) 6 }	Designing, 1. Mechl. Eng. Lab., 5. Ore Deposits, (*b*) 6, 7. Petrography, (*a*) 6, 7. Surveying, 1.** Theory of Str., 3, 1** Thermodyn., 4.*	Designing, 3. Dyn. of Mach., (*a*) 5. Elect. Eng., 4. Freehand Drawing, 1. Metallurgy (*b*) 6. Mining Prob. (*b*) 7. Surveying, 1.** Thermodyn. (*b*) 5. Colloq. (*a*) 6, 7.	Designing, 1, (*b*) 3. Mechl. Eng., 5; (*a*) 3, 4, 6, 7. Colloq. (*b*) 6, 7.	Elect. Eng., (*a*) 4. Geodesy, 3. Geology, (*a*) 1. Mechl. Eng. Lab., 5. Min. & Metall. Lab. 6, 7. Water Colouring, (*b*) 1.	Do.
11	Electro-Chem. Lab. (*b*) 4. Freehand Drawing, (*a*) 1. Mining Mach. (*b*) 6, 7. Municipal Eng. 3 & 1 ** Ore Dressing (*a*) 6, 7 Thermodyn., 4.* Water Colouring, (*b*) 1	Elect. Eng., 4. Metall (*b*) 6 } (*b*) 7 ** Physiography } Designing, 1. Mechl. Eng. Lab., 5. Ore-dress., (*a*) 6, 7. Org. Chem., 2.	A. C. Machy., 4. Designing, 3. Dyn. of Mach., (*a*) 5. Freehand Drawing, 1. Mineralogy (*a*) 2, 6, 7. Ore Deposits, (*b*) 6, 7. Thermodyn., (*b*) 5.	A. C. Machy., 4. Designing, 1 Metallurgy, (*b*) 6, 7. Mining Mach., (*a*) 6 7. Railway Eng., 3. Thermodyn., 5.	A. C. Machy., 4. Designing, 3. Freehand Drawing, 1. Mechl. Eng. Lab., 5. Min. & Metall. Lab. 6, 7.	Do.
12	Architecture, 1. Chemistry, 2. Geodesy, 3. Machine Design, 5; (*a*) 4. Metallurgy, 6, 7.	Designing, 1, 3. Mechl. Eng. Lab, 5. Metallurgy, 6, 7. Phys. Chemistry, 4.	Mach. Des, 5; (*a*) 4 Mineralogy, (*a*) 2. 6, 7. Ore Deposits, , (*b*) 6, 7 Struct. Eng., 1, 3.	Canadian Geology (*a*) 7. Designing, 1, 3. Dyn. of Mach., 5. Org. Chemistry, 2 Pract Geology } (*b*) 7 ** Metallurgy, 6. }	Electro Chem., (*b*) 4. Freehand Drawing, 1 Mechl. Eng. Lab., 5. Min. & Metall. Lab. 6, 7. Theory of Struct., 3 & 1 **	Do.
2 to 5	Chemical Lab., 2; (*a*) 6,7. Designing, 1, 3, 5; (*b*) 6, 7. Dynamo Lab., 4.	Chemical Lab., 2; (*a*) 6,7. Designing, 1, 3, 5 Hydraulic Lab., (*a*) 3, 4. Mechl. Eng. Lab., 5. Petrog. Lab., (*b*) 6, 7.	Chem. Lab., 2. 6; (*b*) 7. Designing, 1. Dynamo Lab, 4. Hydraulic Lab. (*a*) 5, 7. Shopwork (*b*) 5. Testing Lab., (*f*) 5.	Chemical Lab., 2, 6. 7. Designing, 5; (*a*) 1. Mechl. Eng. Lab, 4. Modelling, (*b*) 1. Testing Lab., 3 & 1 **	Chemical Lab.. 2. Dynamo Lab.. (*a*) 4. Designing, 1. Graph. Statics., 3 & 1** Mechl. Eng. Lab., 5. Min. & Metall. Lab., 6, 7. Struct.. Eng. 1 & 3.	

**Optional Course. (*a*) First Term. (*b*) Second Term. (*e*) First half of second Term. (*f*) Second half of second Term. 1. Architectural Students. 2. Chemistry Students. 3. Civil Engineering Students. 4. Electrical Students. 5. Mechanical Engineering Students. 6. Metallurgical Students. 7. Mining Engineering Studnts.

The Chemical Laboratories are open to Second, Third and Fourth Year Classes daily (Saturday excepted) from 9 a.m. to 5 p.m.

*Fourth year electricals with third year mechanicals.

FACULTY OF APPLIED SCIENCE.

Christmas Examinations, December, 1903.

(Subject to Alteration by the Faculty.)

Day and Date.	First Year.	Second Year.	Third Year.	Fourth Year.
Monday, 14...A.M.			Graph. Stat. (*D*).	Ore Dressing.
P.M.				Hy draul. Lab.
Tuesday, 15....A.M.			Elect. Magnet.	Mech. Engin.
P.M.		Chemistry (*M*)	Geology (*M*).	
Wednesday, 16. A.M.	Exp. Physics.	Surveying (*D*)	Surveying (*D*)	Hydraulics.
Thursday, 17..A.M.		Mathematics.	Mathematics.	Mineralogy. (*C*).
				Pract. Astron.
				Mach. Design
P.M.	Mathematics.			
Friday, 18.....A.M.	Geom. Drawing (*D*).	Exp. Physics.	Metallurgy.	Metallurgy.
				Elect. Lighting.

(*C*). Chemistry Bdg. (*D*). Drawing Rooms, Engin. Bdg. (*M*). Molson Hall. Al other examinations, Carpenter Shop, Engin. Bdg.

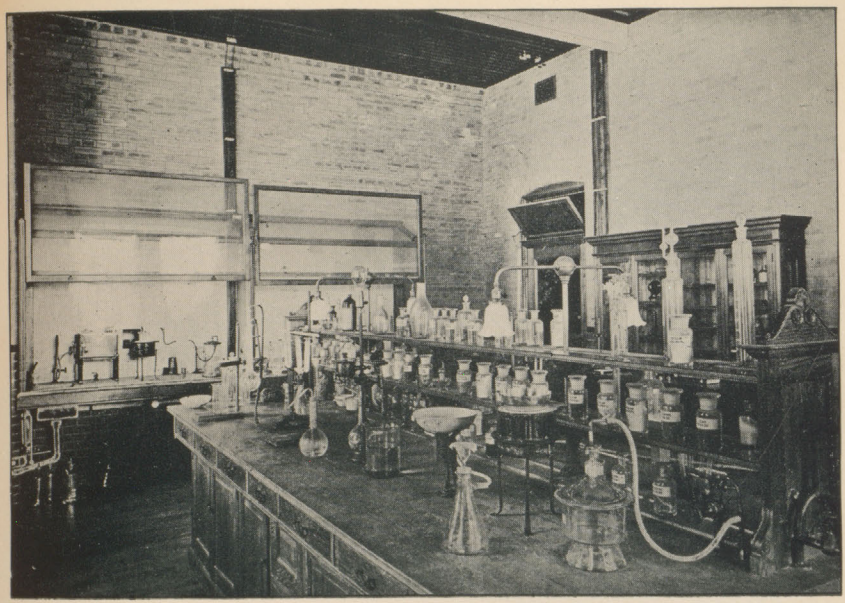
FACULTY OF APPLIED SCIENCE.

April Examinations, 1904.

(Subject to Alteration by the Faculty.)

Day and Date.	First Year.	Second Year.	Third Year.	Fourth Year.
Tuesday, April 5.....A.M.	Des. Geom. (*D*).	Des. Geom. (*D*).	Th. Struct. Org. Chem. (*M*)	Th. Struct. Elect. Rail. Mechl. Engin.
Wednesday, April 6...A.M.	Exp. Physics.	Exp. Physics.	Ore Dressing.	Th. Struct., (*D*). Designing, (*D*). Canad. Geol. (*C*).
Thursday, April 7.....A.M.		Chemistry (*M*).	Architecture. Pract. Astron. D. C. Dyn. Mach. Org. Chem. (*M*).	Architecture. Geodesy. A. C. Mach. Thermo. Lab. Mining.
Friday, April 8.....A.M.	Algebra.		Geology (*M*). Dyn. of Mach.	Elect. Chem. Dyn. of Mach. M. & M. Mach. Prob. & All.
P.M.		Prac. Chem. (*C*).	Geology (*M*).	
Saturday, April 9.....A.M.	Dynamics.	Calculus.	Anal. Chem.	Metall. Cu. Pb.
Monday, April 11.....A.M.		Kinematics.	Testing Lab. Indus. Chem.	Th. Struct. Adv. Metall. Phys. Chem.
P.M.			Struct. Engin. Elect. Meas.	Physiog. Struct. Engin.
Tuesday, April 12.....A.M.	English.	El. Archit. (*D*). Mech. Drawing (*D*).	Des. Geom. (*D*). Mech. Draw. (*D*).	Hyd. Mach.
P.M.			Art Hist. Assaying.	Art. Hist. Gas Anal.
Wednesday, April 13..A.M.		Mechanics.	Mechanics.	Hydraulics. Elec. Metall.
Thursday, April 14....A.M.	Trigonometry.	Surv. (*D*). Prac. Chem. (*C*)	Thermodyn. Transport.	Thermodyn. Petrography (*C*).
Friday, April 15.....A.M.		Hist. Arch. Phys. Lab.	Hist. Archt. R. R. Engin. Mach. Design.	R. R. Engin. Mach. Desgn. Pr. Geol. Ore Dep. (*C*).
Saturday, April 16.....A.M.			Munic. Engin. Mineral. (*C*)	Munic Engin. Miner. Anal.

(*C*). Chemistry Bldg. (*D*). Drawing Rooms, Engin. Bdg. (*M*). Molson Hall. All other examinations, Carpenter Shop, Engin. Bdg.



Macdonald Chemistry Building.—A Research Laboratory.



Macdonald Mining Building.—An Assay Room.

Faculty of Law.

(Macdonald Foundation).

The Curriculum extends over three years. It includes lectures upon all the branches of the Law administered in the Province of Quebec, and also upon Roman Law, Legal History, and the Constitutional Law of England, and of the Dominion. Its primary design is to afford a comprehensive legal education for students who intend to practise at the Bar of the Province. In all the courses the attention of students will be directed to the sources of the Law, and to its historical development. During their First Year the students will attend one hundred lectures on Roman Law, from which the Law of this Province is in great part derived. In the lectures on Legal History, the history of our law since the Cession, and its relation with the French and with the English laws, will be explained. First Year Students will also attend courses on the Law of Persons; the Law of Real Estate; the Law of Obligations; the Elementary rules of Procedure; and an introductory course on Criminal Law. The remaining branches of law, civil, commercial, and criminal, will be dealt with in the Second and Third years. During the three years the Civil Code, the Criminal Code, and the Code of Civil Procedure will be covered, and lectures will also be given upon subjects, such as Bills of Exchange, Merchant Shipping, and Banking, which are regulated mainly by special statutes.

Students have the free use of the Law Library of the Faculty, to which large additions are continually being made, those lately added including the Ontario Reports, Dalloz, Recueil Périodique, and such valuable works of reference as the American and English Encyclopædia of Law and the American and English Encyclopædia of Pleading and Practice. The principal reports and legal periodicals are taken. A special room for Law Students is provided in the Redpath Library. This room is open during the day, and in the evenings from eight to ten o'clock.

The lectures are delivered in the rooms furnished for the Faculty in the East Wing of McGill College by its munificent

benefactor, Sir Wm. C. Macdonald. The Faculty desire to impress upon English students the great importance of obtaining a familiar knowledge of French. In the practice of the profession in this Province it is almost indispensable that a lawyer shall be able to write and speak French. All who intend to become Students of Law are urged to pay special attention to this subject.

Those students who are able to take the B.A. course before entering upon their legal studies are strongly recommended to do so. Those for whom this is impossible are advised to attend the course in the Faculty of Arts for two years.

Matriculation.

For particulars of the University Matriculation Examination for Students in Law see pp. 10–21.

The attention of students who intend to practise law in the Province of Quebec, or to be admitted to the notarial profession, is called to the statutory requirements as to admission to study. These will be found on pp. 229–231.

Scholarships aad Prizes.

Various scholarships and prizes will be awarded to the students of each year who obtain the highest distinction at the Examinations in April, 1904.

No scholarship or prize will, however, be awarded to any student unless in the estimation of the Faculty a sufficiently high standing be attained to merit it.

Faculty Regulations.

1. Students of Law shall be known as of the First, Second, and Third Year, and shall be so graded by the Faculty. In each year, students shall take the studies fixed for that year, and those only, unless by special permission of the Faculty.

2. The Register of Matriculation shall be closed on the 1st of October in each year, and return thereof shall be immediately made by the Dean to the Registrar of the University. Candidates applying thereafter may be admitted on a special examination to be determined by the Faculty; and, if admitted, their names shall be returned in a supplementary list to the Registrar.

3. The lectures will be delivered between the hours of half-past 8 and half-past 9 in the morning, and between 4 and half-

past 6 in the afternoon; and special lectures in the evening at such hours and in such order as shall be determined by the Faculty. Professors shall have the right to substitute an examination for any such lecture.

4. At the end of each College Year there shall be a general examination of all the classes, under the superintendence of the Professors, and of such other examiners as may be appointed by the Corporation. The examination shall be conducted by means of printed questions, answered by the students in writing in the presence of the examiners. The result shall be reported as early as possible to the Faculty.

After the examination, the Faculty shall decide the general standing of the students.

5. At the end of the Third College Year there shall be a Final Examination of those students who have completed the Curriculum. This Examination shall be conducted partly by written papers and partly orally. It shall cover all the subjects upon which lectures have been delivered during the three years' course. Those students who satisfy the examiners shall be entitled, after making the necessary declaration and payment of the Graduation Fee, to proceed to the Degree of B.C.L. The Elizabeth Torrance Gold Medal shall be awarded to the student who shall obtain the highest marks in the Examination, provided his answers shall, in the estimation of the Faculty, be of sufficient merit to entitle him to this distinction. There shall be no Sessional Examination of students who are candidates in the Final Examination.

6. No student shall be considered as having kept a Session unless he shall have attended regularly all the Courses of Lectures, and shall have passed the Sessional Examinations to the satisfaction of the Faculty in the classes of his year.

7. The Faculty shall have the power, upon special and sufficient cause shown, to grant a dispensation to any student from attendance on any particular Course or Courses of Lectures, but no distinction shall in consequence be made between the Examinations of such students and those of the students regularly attending Lectures.

8. Every Candidate, before receiving the Degree of B.C.L., shall make and sign the following declaration:—

Ego A.B. polliceor sancteque recipio, me, pro meis viribus, studiosum fore communis hujus Universitatis boni, et operam daturum ut ejus decus et dignitatem promoveam, et officiis

omnibus ad Baccalaureatus in Jure Civili gradum pertinentibus fungar.

Fees.

See page 32.

Special Holidays.

On the following days, when they fall within the session, no lectures will be delivered, viz.: Good Friday, Easter Monday, and Thanksgiving Day. On the following days the morning lectures will be omitted, viz.: Ash Wednesday, All Saints Day (Nov. 1st), and Conception (Dec. 8th).

Examinations.

The University Examinations are held in April, at the close of the session.

COURSES OF LECTURES.

Roman Law.

PROFESSOR WALTON.

During the first part the external history of the law from the early period to the codification of Justinian will be dealt with. The sources of the law will be described, and the gradual evolution explained, by which the law of the city of Rome became fitted to be the law of the civilized world. A brief sketch will be given of the legal institutions of Rome in the first period and of the early constitutional history.

In the doctrinal part of the course matters mainly of antiquarian interest will be touched on but slightly. Those portions of the Roman Law which have been followed most closely in the existing law of the Province, *e.g.*, Property, Servitudes, Pignus and Hypothec, and Obligations, will be treated in detail, and the modifications made by the modern law will be noticed. Class-examinations will be held from time to time, and a first and second prize of books will be given to the two students who obtain the highest marks in these examinations.

Text-book, Moyle's or Sandar's Institutes of Justinian, or Girard, Manuel de Droit Romain.

Books of reference :

Muirhead's Historical Introduction to Roman Law.

Muirhead's Institutes of Gaius.

Maynz, Cours de Droit Romain.
Puchta, Institutionen.
Maine's Ancient Law.

Constitutional and Administrative Law.

PROFESSOR WALTON.

The object of this course is to shew the actual working of the Canadian Constitution. A sketch of the Constitutional History prior to Confederation is given. The B. N. A. Act is explained, and the leading cases discussed which illustrate the respective powers of the Federal and of the Provincial Legislatures. The growth of Cabinet Government is traced, and some of the fundamental rules of the English Constitution are expounded and contrasted with those followed in other countries.

No text-book is prescribed, but students are recommended to refer to Todd, Parliamentary Government in the British Colonies; Houston, Constitutional Documents of Canada; Dicey, Law of the Constitution; Anson, Law and Custom of the Constitution.

Legal History and Bibliography.

PROFESSOR MCGOUN.

This course comprises an outline of the history of the law in force in the Province of Quebec.

The main source from which this law is derived is the Customary Law of France, as modified by the principles of Roman Law, embodied in several of the codes or collections of Roman Law before the time of Justinian. The Customs of France after being reduced to writing were further modified by the influence of modern Roman Law, which prevailed throughout the larger part of France. The ordinances of the French kings and the commentaries of the great jurists, from Cujas and Dumoulin down to Pothier, brought the Civil Law of France into the systematic form in which it was introduced into this Province. The Custom of Paris, one of the most important of those recognized in France, became formally the basis of the Civil Law in this country, and the ordinance of 1667 was the main authority for procedure.

Since the opening of the British régime the development of Lower Canadian Civil Law has proceeded independently of the Civil Law of France, where the Code Napoléon was passed early

in the Century. In Lower Canada a code on the same lines was adopted shortly before Confederation. Lower Canadian Civil Law has been modified by English Law in commercial matters, and also by statutes passed in the Province. The Criminal Law has been derived almost exclusively from the Criminal Law of England.

The leading authorities upon the main branches of the law, with the reports of decisions of our courts, are brought under the attention of the students in this course.

Agency and Partnership.

PROFESSOR MCGOUN.

This course begins with the principles of the law of Mandate as laid down in the Civil Code of Lower Canada, and treats of Civil and of Commercial Agency. The rights and liabilities of principal and agent both between themselves and in relation to third parties is considered, and special attention is directed to the powers of agents in selling, pledging, and dealing with the property of the principal. The law relating to Factors or Commission Merchants, Brokers, and other Agents is explained.

In partnership the right of each partner to bind his fellow partner in virtue of the mandate reciprocally given and enjoyed, leads to the distinction between Civil and Commercial partnership, and the Limited Partnership or Société en Commandite is also treated of. The distinction between Partnership and Joint Stock Companies leads to a consideration of the connexion between this subject and the subject of Companies and Corporations which form the subject matter of a Course in alternate years on the Law of Corporations and of Joint Stock Companies, as follows:

Law of Corporations and of Joint Stock Companies.

This course is the sequel of the course on Agency and Partnership. The doctrine of limited liability and the opportunity which it affords of carrying out enterprises of great importance, by means of capital contributed by a large number of individuals, is treated of in this course. The growth of Corporations, both those established by long custom, and those created by Royal Charter, or by Parliamentary or Legislative authority, is also explained, as well as the relation between these corporations and the ordinary forms of joint stock companies. Cor-

porations sole and Corporations aggregate are defined, and the principles of laws relating to Corporations and Companies explained.

Criminal Law.

PROFESSOR MR. JUSTICE DAVIDSON.

This course includes :

A history of the Criminal Law and Criminal Procedure of England; and of their introduction into and development throughout Canada; discussion of the Criminal Code and other Statutes enacting criminal offences; of the rules of evidence in criminal cases; of the Fugitive Offenders' Act; of extradition; and generally of the principal features belonging to the Criminal Law of the Dominion.

Commercial Law.

PROFESSOR R. C. SMITH.

The subjects dealt with will include Commercial Sales, Bills and Notes, the law of Carriers, the law of Insurance and the law of Banks and Banking.

1. The course on Carriers will cover:
   (*a*) Carriers, contracts with;
   (*b*) Affreightment;
   (*c*) Merchant Shipping;
   (*d*) Bottomry and Respondentia.
2. The course on Insurance will cover:
   (*a*) Insurance, contracts of;
   (*b*) Marine Insurance;
   (*c*) Fire Insurance;
   (*d*) Life Insurance.

Civil Procedure.

MR. GORDON W. MACDOUGALL.

This course to the students of the First Year is intended to form an introduction to the subject, to explain the simpler kinds of actions, the general rules of pleading, and the jurisdiction of the several courts.

The revised Code of Civil Procedure for the Province of Quebec is the text-book.

Civil Procedure.

MR. PERCY C. RYAN.

The advanced course for the Second and Third Years covers all matters of procedure not dealt with in the First Year Course, and includes Provisional Remedies, such as capias, attachment before judgment, injunction, etc., and special proceedings, such as proceedings relating to corporations, and public offices, mandamus, etc., as well as the rules of pleading in the more complicated classes of action. It will be divided into two parts, which will be taken in alternate years.

Marriage Covenants and Minor Contracts, Prescription, Lease, and Municipal Law.

PROFESSOR, MR. JUSTICE FORTIN.

Two courses—in alternate years.

Successions, Gifts, and Substitutions.

PROFESSOR MR. JUSTICE DOHERTY.

Two courses—in alternate years.

I. The Law of Succession.

The course consists of a commentary and explanation of the whole of Title I, and the Third Chapter of Title II of the Third Book of the Civil Code. The order followed by the Code in dealing with the different matters coming within the scope of this course, has however been departed from, with a view of presenting to the student the law governing successions as one whole. The subject will be developed as nearly as possible in the following order:—

1. General notions, definitions, and divisions of the subject; The Testamentary Succession; The Ab-Intestate Succession.
2. Rules of Law common to both Successions.
3. Rules peculiar to the Testamentary Succession.
4. Rules peculiar to the Ab-Intestate Succession.
5. Partition of the Succession (and of property held in undivided ownership generally), its incidents and effects.

II. Gifts and Substitutions.

This course comprises a commentary on and explanation of Chapters I, II, and IV of Title II of the Third Book of the Civil Code, dealing with:

1. Gifts inter vivos.

2. Gifts in contemplation of death, as permitted in Contracts of Marriage.

3. Substitutions.

Obligations.

MR. AIME GEOFFRION.

This course of lectures will consist of a commentary on the title on obligations in the Civil Code, less the chapter of proof (articles 982 to 1,202 inclusive). Our law on the subject will be compared with the old French law and the modern French law, and its general principles will be explained and illustrated.

Real Property Law and Registration.

PROFESSOR MARLER.

First Year Course—25 lectures.

Distinction of Things—Corporeal moveables and immoveables; Immoveables by incorporation and destination; Incorporeal property; Real and personal rights.

Ownership—Its characteristics and limitations; Possession, good and bad faith; Possessory actions; The Petitory Action; Their results on the Possessor; Accession, natural and industrial.

Usufruct—General characteristics; Fruits and their perception; Quasi-usufruct; Modes of enjoyment by usufructuary; His duties before and during usufruct; How terminated.

Registration—Its modes and formalities; The Cadastral System.

Second and Third Year Courses—25 Lectures in alternate Courses.

First Course—Mode of acquisition of Immoveables—25 Lectures.

In this Course, a Deed of Sale will be analysed and its various clauses explained: The parties; The description and the measurement of land; The obligations of buyer and seller and the security for their performance; Warranty, its modifications and results; The form and registration of the deed; The rights of the wife; The distinctions between Sale and other modes of acquisition, and their effects on the parties.

Forced sales, their incidents and results.

Examination of Titles, practically considered.

Second Course:—Privileges and Hypothecs; Servitudes—25 Lectures.

Debts and Causes of Preference.

Characteristics of Hypothec; The various kinds, their history, conditions and effects; The Ranking of Hypothecs; The Hypothecary action, its characteristics, incidents and results.

Privileges on immoveables.

Registration of Privileges and Hypothecs.

Servitudes.—Natural, legal and conventional; Water Courses and streams; Walls and fences.

Public International Law.

PROFESSOR LAFLEUR.

Sovereignty and equality of Independent States; Recognition of Belligerency and Independence; Justifiable grounds of intervention; Modes of territorial acquisition; Territorial boundaries; Doctrine of Exterritoriality; Treaties and Arbitrations; Laws of War; Neutrality of States and of individuals; Laws of Blockade; Contraband; Confiscation; Prize-Courts and their jurisprudence.

The students' attention will be specially directed to Treaties, Diplomatic Relations, and International Arbitrations, in which Canada is directly concerned.

Private International Law.

PROFESSOR LAFLEUR.

Distinction between the *a priori* and positive methods; Sources of the positive law of Quebec on the subjects; Application and illustrations of the rules for solving conflicts of law in regard to the different titles of the Civil Code; Comparisons between our jurisprudence and that of England, France and Germany.

These two courses will be given in alternate years.

Requirements for the Degree of Doctor of Civil Law.

Adopted March, 1891.

Every candidate for the degree of D.C.L. in Course must be a bachelor of Civil Law of twelve years' standing, and must pass such examination for the Degree of D.C.L. as shall be prescribed by the Faculty of Law. He shall also, at least two months before proceeding to the Degree, deliver to the Faculty twenty-five printed copies of a Thesis or Treatise of his own composition on some subject, selected or approved by the Fac-

ulty, such Thesis to contain not less than fifty octavo pages of printed matter, and to possess such degree of merit as shall, in the opinion of the Faculty, justify them in recommending him for the degree.

The Examination for the Degree of D.C.L. in Course, shall, until changed, be on the following subjects and authors, with the requirement of special proficieney in some one of the groups below indicated. In the groups other than the one selected by the Candidate for special proficiency, a thorough acquaintance with two works of each group shall be sufficient, including in all cases the work first mentioned in each group and the first two works in the third group. In the first group one work on Public and one on Private International Law must be offered.

1. International Law

A. Public:—
Twiss, Sir T., Law of Nations.
Hall, W. E., International Law.
Harcourt, Sir W. V., Letters by *Historicus*.
Ortolan, T., Diplomatie de la Mer.
De Martens, Droit International.
Holland, Studies in International Law.

B. Private:—
Savigny, Private International Law (Ed. Guthrie).
Bar, Private International Law (Ed. Gillespie).
Foelix, Droit International Privé.
Laurent, Droit Civil International.
Brosher, Droit International Privé.
Fiore, Droit International Privé (Ed. Pradier-Fodéré).
Dicey, Conflict of Laws.
Story, Conflict of Laws.
Lafleur, E., Conflict of Laws.

2. Roman Law.

Maynz, Droit Romain.
Muirhead's Roman Law.
Girard, Manuel de Droit Romain.
Ortolan's Institutes (Ed. Labbé).
Savigny, Roman Law in the Middle Ages.
Cuq, Les Institutions Juridiques.
Puchta, Institutionen.

Krüger, Römische Rechtsquellen.
Roby's Introduction to the Digest.
Hunter's Roman Law.

3. Constitutional History and Law.

Dicey's Law of the Constitution.
Stubbs' Constitutional Law of England.
Hearn, Government of England.
Bagehot, English Constitution.
Franqueville, Gouvernement et Parlement Britanniques.
Gneist, Constitution of England.
Hallam, Constitutional History of England.
May, Constitutional History of England.
Gardiner, Constitutional History of England.
Freeman, Growth of the English Constitution.
Mill, Representative Government.
Anson, Law and Custom of the Constitution.

4. Constitution of Canada and Works Relevant Thereto.

Todd, Parliamentary Government in the British Colonies.
Bourinot, Federal Government in Canada.
Cartwright, Cases under the British North America Act.
Lord Durham's Report on British North America.
Lareau, Histoire du Droit Canadien.
Houston's Constitutional Documents of Canada.
Volume O., Statutes of Lower Canada.
Maseres' Collection of Quebec Commissions.
Viollet, Histoire du Droit Français.
Dilke, Problems of Greater Britain.
Bryce, American Commonwealth.
Cooley, Principles of Constitutional Law.
Curtis, History of the Constitution of the United States.

5. Criminal Law, Jurisprudence, and Political Science

Stephen, History of the Criminal Law.
Blackstone, Vol. IV.
Harris, Principles of Criminal Law.
Holland, Elements of Jurisprudence.
Austin, Lectures, omitting chapters on Utilitarianism.
Lorimer's Institutes.
Amos, Science of Law.

Woolsey, Political Ethics.
Lieber, Political Ethics.
Freeman, Comparative Politics.
Aristotle's Politics, by Jowett.

APPENDIX.

The attention of intending Students is called to the following provisions of the Revised Statutes of Quebec and amendments, as bearing on the requirements for the study and practice of Law in the Province.

I. Regulations Applicable to those who Intend to Become Members of the Bar.

Article 3544 R.S.Q.—Examinations for admission to study and to practice law in the Province of Quebec are held at the time and place determined by the General Council.

The examinations for the practice are held alternately in Montreal and Quebec every six months, namely—at Montreal, on the second Tuesday of each January, and at Quebec on the first Tuesday of each July.

All information concerning all these examinations can be obtained from the General Secretary's Office. The present General Secretary is Arthur Globensky, Esq., Montreal.

Article 3546.—Candidates must give notice as prescribed by this article at least one month for the study and fifteen days for the practice before the time fixed for the examination to the Secretary of the Section in which he has his domicile or in which he has resided for the past six months.

The present Secretary of the Montreal Section is Robert Taschereau, Esq., N. Y. Life Building, Montreal.

Article 3503a. (added by Statute of Quebec, 1890, 53 Victoria Cap. 45). This article provides that Candidates holding the Diploma of Bachelor of Arts, Bachelier-ès-Lettres, or Bachelier-ès-Sciences from a Canadian or other British University are dispensed from the examination for admission to study. Such Candidates are required to give the notice mentioned above.

Article 3548 R.S.Q. (as altered by by-law of the General Council).—On giving the notice prescribed by Article 3546, the Candidate pays the Secretary a fee of $2, and makes a deposit of $45 for a complete certificate of admission to study;

of $30 for a partial certificate of admission to study; and of $70 for admission to practice, which deposit, less $10, is returned in case of his not being admitted.

Article 3552 (amended 1894, Q. 57 Vic., c. 34).—To be admitted to practice, the Student must be a British subject, and must have studied regularly and without interruption during ordinary office hours, under indentures before a Notary as Clerk, or Student with a practicing Advocate, during four years, *dating from the registration of the certificate of admission to study.* This term is reduced to three years in the case of a student who has followed a regular law course in a University or College in this Province and taken a degree in law therein.

The By-Laws passed by the General Council of the Bar of the Province of Quebec, 16th Sept., 1886, and amended 10th Feb., 1892, provide as follows:—

Art. 42.—A course of lectures on law given and followed at a University or College in this Province, and a diploma or degree conferred on students by such University or College, shall be held to be such as contemplated in Art. 3552 R.S.Q. only when the University or College conferring the degree and the student who receives it shall have efficiently followed the programme herein set forth. This article and article 44 shall apply to students already admitted only as regards lectures to be given after the 1st of January, 1887.

2. The subjects on which lectures shall be given, and the number of lectures required on each subject for a regular course of lectures on law in a University or College shall be as follows:—

Roman Law:—103 Lectures:—This subject shall include an introduction to the study of Law and the explanation of and comments on the Institutes of Justinian and the principal jurisconsults of Rome.

Civil, Commercial, and Maritime Law:—413 Lectures:—Lectures on these subjects shall cover at least three years. They consist of the history of French and Canadian law, the explanation of and comments on the Civil Code of the Province of Quebec and the Statutes relating to Commerce and Merchant Shipping.

Civil Procedure:—103 Lectures:—Lectures on this subject shall extend over at least two years. It shall consist of the explanation of and comments on the Code of Civil Pro-

cedure and the Statutes amending it, the organization of the Civil Courts of this Province and the history of the different judicial systems of the country; also, the special modes of procedure provided by statutes and laws of general application.

International Law, Private and Public:—21 Lectures:—

Criminal Law:—69 Lectures:—This subject includes the history of criminal law in Canada, the constitution of criminal courts, criminal procedure, comments on statutes relating to criminal law, the relation of criminal law in Canada to the criminal law of England. The lectures shall extend over two years.

Administrative and Constitutional Law:—41 Lectures. —These subjects include an inquiry into the different political institutions and the public institutions of the country, the powers, organization and procedure of the Federal Parliament and of the Local Legislature, the laws on Education and the Municipal Code.

Art. 43.—Candidates for practice who hold a degree in law from a University or College in this Province shall produce with their notices, a certificate from the principal or rector of such University or College to the effect that they followed a course of lectures on law in the same, during at least three years, in conformity with the by-laws of the Bar; and such certificate shall further specify the number of public lectures at which they shall have attended on each subject mentioned in the foregoing programme, during each of the said three years. The last part of this certificate shall only be required for courses of lectures given after the 1st January, 1897.

Art. 44.—The examiners shall not consider a university degree in law valid for the purposes of admission to the Bar if they find that the candidate has not in fact followed the programme above.

II. Regulations Applicable to those who Intend to Become Notaries.

For the regulations applicable to the candidates for the Notarial Profession see Revised Statutes of Quebec, Arts. 3801-3833, and 53 Vict., c. 45 Queb.).

TIME TABLE.

SESSION 1903-1904.

INTRODUCTORY LECTURE, MONDAY, 14TH SEPT., 4 P.M.

FIRST YEAR STUDENTS.

TUESDAY, 15TH SEPT., TO FRIDAY, 13TH NOVEMBER—9 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Obligations. Mr. A. Geoffrion	Procedure. Mr. Gordon Macdougall.	Obligations.	Procedure.	Obligations.
4.00	Roman Law. The Dean.	Rom.	Rom.	Rom.	Constitutional Law. The Dean.
5.00	Legal History. Prof. McGoun.	Persons. Prof. Lafleur.	Hist.	Persons.	Hist.

MONDAY, 16TH NOV., TO FRIDAY, 18TH DEC.—5 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Obligations.	Procedure.	Obligations.	Proced.	Obligations.
4.00	Roman.	Rom.	Rom.	Rom.	Const.
5.00	Real Rights. Prof. Marler	Persons.	Persons.	Persons.	Real Rights.

MONDAY, 4TH JAN., TO FRIDAY, 4TH MARCH—9 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY	THURSDAY.	FRIDAY.
8.30	Obligations.		Obligations.		Obligations.
4.00	Roman.	Constitutional Law. The Dean.	Rom.	Const.	Rom.
5.00	Real Rights. Three Weeks.	Roman.	Real Rights.	Rom.	Real Rights.

MONDAY, 7TH MARCH, TO FRIDAY, 1ST APRIL, 4 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY
8.30					
4.00	Roman.	Const.	Rom.	Const.	Rom.
5.00	Criminal Law. Prof. Mr. Justice Davidson.	Crim.	Crim.		Crim.

Roman Law	115 lectures.	Criminal	10 lectures.
Legal History	25 "	Constitutional and Administrative Law	39 "
Persons	25 "		
Real Rights	25 "	Total	314
Procedure	25 "		
Obligations	50 "		

TIME TABLE.

SESSION 1903-1904.

INTRODUCTORY LECTURE, MONDAY, 14TH SEPT., 4 P.M.

SECOND AND THIRD YEAR STUDENTS.

TUESDAY, 15TH SEPT., TO FRIDAY, 13TH NOVEMBER—9 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Gifts and Substitutions. Prof. Mr. Justice Doherty.	Civ. Procedure. Mr. Ryan.	Gifts and Substitutions.	Civ. Proced.	Gifts and Substitutions.
4.00	Marriage Covenants, &c. Prof. Mr. Justice Fortin.	Marriage Covenants, &c.	Obligations. Special Course. The Dean.	Marriage Covenants, &c.	Marriage Covenants, &c.
5.00	Criminal Law. Prof. Mr. Justice Davidson.	Commercial Law. Prof. R. C. Smith	Crim.	Comm. Law.	Crim.

MONDAY, 16TH NOV., TO FRIDAY, 18TH DEC.—5 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Gifts, &c.	Civ. Proced.	Gifts, &c.	Civ. Proced.	Gifts, &c.
4.00	Marriage Covenants, &c. Prof. Mr. Justice Fortin.	Marriage Covenants, &c.	Obligations.	Marriage Covenants, &c.	Marriage Covenants, &c.
5.00	Criminal.	Commercial Law.	Crim.	Comm. Law.	Crim.

MONDAY, 4TH JAN., TO FRIDAY, 4TH MARCH—9 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Gifts, &c. 5 wks. Civ. Proced. 4 weeks.	Agency, &c. Prof. McGoun.	Gifts, &c. Civ. Proced.	Agency, &c.	Gifts, &c. Civ. Proced.
4.00	Real Property Law. Prof. Marler. 6 weeks. N.B. This course will begin after the completion of Prof Marler's course to the first year.	Obligations.	Real Property Law.	Obligations.	Real Property Law.
5.50	Private International Law. Prof. Lafleur.	Commercial Law. Prof. R. C. Smith	P. I. L.	Comm. Law.	P. I. L.

MONDAY, 7TH MARCH, TO FRIDAY, 1ST APRIL, 4 WEEKS.

HOURS.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
8.30	Agency, &c.	Civ. Proced	Agency, &c.	Civ. Proced.	Agency, &c.
4.00	R. P. L.		R. P. L.		R. P. L.
5.00	Commercial Law.	P. I. L.	Comm. Law.	P. I. L.	Comm. Law.

Gifts and Wills	50 lectures.	Criminal Law	40 lectures.
Commercial Law	50 "	Procedure	40 "
Agency, &c	25 "	International	25 "
Real Property Law	25 "	Obligations	40
Marriage Covenants	25 "		
Minor Contracts	25 "	Total	345

Faculty of Medicine.

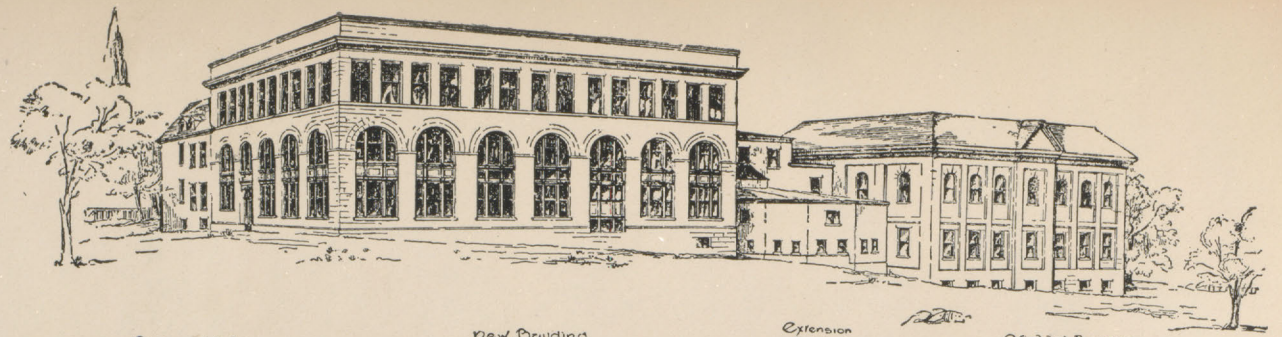
I.

Foundation and Early History.

The Seventy-second Session of this Faculty will be opened on Tuesday, September 22nd, 1903, by an introductory lecture at 3 p.m. The regular lectures in all subjects will begin on September 23rd at the hours specified in the time-tables, and will be continued until May 21st, 1904, when the annual examinations will begin.

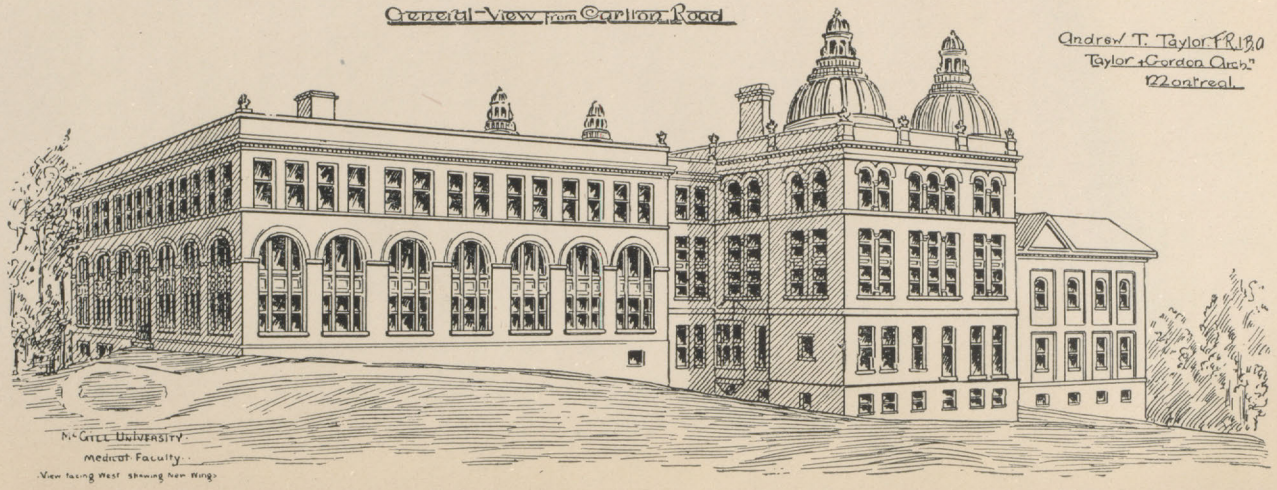
The Faculty of Medicine of McGill University is the direct outcome and continuance of a teaching body known as the Montreal Medical Institution which was organized as a full medical school in the years 1823-24 by Drs. Wm. Robertson, Wm. Caldwell, A. F. Holmes, John Stephenson and H. P. Loedel. These men constituted the first medical staff of the Montreal General Hospital, itself established in 1819. The first session of the Montreal Medical Institution opened in November, 1824, with 25 students, and the lectures were given at the House of the Institution, No. 20 St. James Street, a building situate on the north side of St. James Street, on or near Place d'Armes.

In the year 1829, the Montreal Medical Institution became, by the formal act of the Governors of the Royal Institution for the Advancement of Learning, the Medical Faculty of McGill University. It was a condition of the bequest of the late Hon. James McGill that the college must be in operation within a certain number of years of his decease; failing this, the money and the Estate of Burnside on which the college was to be built, were to pass to the heirs-at-law, the Desrivieres family. To enable this essential condition to be realized, the Montreal Medical Institution, then an active teaching body of



General View from Carlton Road

Andrew T. Taylor F.R.I.B.A.
Taylor & Gordon Archts
Montreal.



McGILL UNIVERSITY
Medical Faculty
(View facing West showing New Wing)

established reputation, was "engrafted upon" the University of McGill College as its Medical Faculty. This event took place at the first meeting of the Governors of "Burnside University of McGill College," held at Burnside House June 29th, 1829, with the object of organizing the University. The first session of the McGill Medical Faculty took place in the winter of 1829-30, and the first university degree, a medical one, was conferred four years later in 1833.

There were no sessions held during the political troubles of 1836 to 1839, and it is owing to this fact that this is the Seventy-second instead of the Seventy-fifth Session of the Faculty, dating from its incorporation with the University in the year 1829.

In 1844 the number of students in the Medical Faculty was 50; in 1851, 64 with 15 graduates; in 1872-73, 154 with 35 graduates; in 1892-93, 315 with 46 graduates; in 1895-96, 419 with 90 graduates; in 1901-02, 440 students were registered.

After carrying on the work for some years on St. James Street, the Faculty removed to a house on St. George Street, near Craig Street, where they remained until 1845. From 1845 to 1851 they occupied the central part of the present Arts Building, which with the East Wing was the only part of the present Arts Building then standing. The remote situation of the University grounds was found to be a source of great inconvenience to both teachers and students, and the Faculty returned to the heart of the City, to No. 15 Coté Street, for the Session 1851-52. This building was erected for the uses of the Faculty at the private expense of three of its members, who held the Faculty as their tenants until 1860, when the University authorities took over the Coté Street building, at the same time enlarging it at a cost of some $4,100.00, to meet the increased demands of the rapidly growing medical school. The Faculty remained on Coté Street until 1872 when the need of extension was again felt and the front block of the present medical building in the University Grounds was provided by the Governors.

In 1885 this building of 1872, which, as has been said, constitutes the front block of the present building, was again found to be inadequate and an addition was built at the rear, which at the time afforded all the facilities for carrying out the great aim of the Faculty—that of making the teaching of the primary branches thoroughly practical.

Owing to the larger classes and the necessity for more laboratory teaching, the Lecture Rooms and Laboratories added in 1885 soon became insufficient in size and equipment to meet the requirements of the Faculty. The late Mr. John H. R. Molson with timely generosity came to the aid of the Faculty, and in 1893 purchased property adjoining the college grounds, and enabled the Faculty to erect new buildings and extensively alter and improve those already in use.

These wings were completed and officially opened by His Excellency, the Earl of Aberdeen, Visitor of the University, January 8th, 1895. They were erected as an extension of the old building, towards the northwest, partially facing Carlton Road, and convenient to the Royal Victoria Hospital. They connected the Pathological building, the private residence acquired by Mr. Molson in 1893, with the older buildings, and comprised a large lecture room, capable of accommodating 450 students, with adjoining preparation-rooms and new suites of laboratories for Pathology, Histology, Pharmacology and Sanitary Science. The laboratories, etc., in the older buildings were also greatly enlarged and improved.

On the ground floor the Library and Museum were enlarged. The original library of the building erected for the Faculty by the Governors in 1872 was furnished as a reading room for the use of the students, and the extensive reference library of the Faculty was thus for the first time made available for the use of the students.

On this floor were also the Faculty room, the Registrar's office, the special museum for Obstetrics and Gynaecology, together with Professors' rooms, etc. The chemical laboratories were increased by including the laboratories formerly used by the department of Physiology.

In the basement were the janitor's apartments, cloak rooms with numerous lockers for use of students, the lavatory, etc., recently furnished with the most modern sanitary fittings.

In less than five years the extension of the practical laboratory work and the increase in the number of students and teachers made an enlargement of the buildings almost imperative. Before, however, the want of space and equipment was very seriously felt Lord Strathcona generously provided means to meet the requirements.

The New Buildings.

The Faculty has great pleasure in announcing that the new Medical Buildings were formally opened by H.R.H. the Prince of Wales, September 19th, 1901, and are now complete and fully equipped. They are the gift of Lord Strathcona, who in the names of Lady Strathcona and the Hon. Mrs. Howard in 1898, contributed $100,000 towards extensions and alterations of the Medical Buildings. These buildings, the result of this munificent donation, have more than twice the capacity of the buildings occupied during the Session of 1900-1901.

The alterations and extensions may be described as consisting of three wings. First, a Laboratory wing. This wing occupies the north-east corner of the block of buildings and replaces what was formerly the Pathology wing. A second wing connects this with the front building on the east, and the third wing connects the Molson block with the original building on the west side.

The central wings extend east and west about 70 feet and form the central feature of what is now a symmetrical block of cut stone buildings. It will be seen that the stone and brick extensions, erected by the Faculty in 1885, have been entirely removed and replaced by these substantial structures. The alterations and extensions now completed form the larger portion of a scheme of complete reconstruction and extension which will ultimately lead to the replacing of the original stone building now remaining by a façade which will project into the University grounds to the south of the buildings and so convert the whole into a single symmetrical structure.

The new building is of four stories except in the front block, where the three original stories remain. The total length of the buildings, as will be seen by the plan, is 280 feet and the maximum width 145 feet. Its cubic capacity is about 1,750,000 cubic feet, making it the largest of the buildings on the University campus.

The ground floor contains the lavatories, locker rooms, furnace rooms, vat rooms, rooms for stores and janitor's dwelling. In the laboratory wing there is a large recreation room for students, a students' laboratory for pharmacology and therapeutics, a research laboratory and a private room connected with this department.

The first floor, of which a plan has been inserted, contains to the right and left of the entrance, occupying the whole floor

of the original building, a students' Library Reading-room, with accommodation for 200 readers, and the Pathological Museum. The students' reading room is connected with a fireproof stack room which contains the valuable library of the Faculty. This stack room has a capacity of 40,000 volumes, the Library at present containing about 24,000. The Pathological museum on the opposite side of the hall connects with rooms beneath the seats of Lecture Room No. IV. which are used for special collections and for curator's rooms. Four small rooms adjoining are for the use of professors as private rooms. On the opposite side of the hallway in the central section of the building are the professors' common room, the Faculty room and the offices of the Registrar.

The most striking feature in the construction of the building is the large central hall or rotunda extending from the ground floor through the three stories to the roof, lighted by skylight occupying the whole length of the middle section. This hall is 70 feet long by 45 feet wide with galleries at each floor connecting the various laboratories and lecture rooms with broad staircases at each end.

The northern section contains the Chemical Laboratory, 80 feet long by 45 feet wide, and the ceiling 20 feet high, surrounded with draft cupboards, and having benches for 150 to 180 students. Connected with this room is a commodious research laboratory for advanced work in medical chemistry, and a small professor's laboratory. On the opposite side of the hall is a large lecture room with a seating capacity of from 400 to 450, the museum preparation room, a small cloak room and preparation rooms connected with the lecture room.

The floor above in the two southern sections is devoted entirely to Anatomy. The dissecting room ocupying the top of the front building remains unchanged, and is connected on the west with a series of demonstrators' rooms, a private dissecting room and two rooms for the professor of this department. These rooms surround Lecture Room No. II., especially arranged for lectures in Anatomy. On the opposite side of the hall, occupying the same area as the lecture room and adjoining rooms is the Anatomical Museum. Intervening between this and the dissecting room on the east side are a small demonstration room, locker rooms and service rooms connected with the department of Anatomy.

In the northern section are the museum for Hygiene and the Hygiene laboratory. These rooms extend the whole distance across the east and west wings.

On the top floor are the departments of Physiology, Pathology, Bacteriology and Histology. The department of Pathology and Bacteriology has a laboratory of the same dimensions as the chemical laboratory, 80 x 45 feet, especially well lighted with three large roof lights in addition to the lights on both sides. Besides the tables, lockers, etc., provided for students in this department, there is a small demonstrating theatre and a series of small rooms for advanced work and for special purposes. These include a dark room, an incubator room, reference library and three private laboratories. On the opposite side of the hall, occupying a similar floor area, are the laboratories for Physiology, consisting of a students' laboratory which has been especially equipped this year with sets of apparatus for the practical study of the principles of physiology by the graphic method. Connecting the students' laboratory with lecture room No I., to be used for Physiology chiefly, are a series of four rooms for advanced work and special research, service rooms and store rooms.

Occupying the entire northern end of this floor is the Histological laboratory with an adjoining room for private work. This laboratory is 105 feet long and affords space for the use of 150 microscopes at one time.

The laboratory wing is ventilated by a system of artificial ventilation, a powerful fan supplying each laboratory with warm fresh air, while extraction flues, to which extraction fans are attached, draw off the foul air from each room in this wing.

It will thus be seen that the new buildings of the Medical Faculty contain four lecture rooms, three of which have a seating capacity of 250, the fourth from 400 to 450. There are five museums, namely, for Pathology, Anatomy, Obstetrics and Gynaecology, Pharmacy and Hygiene. Other collections are being made and space has been arranged for their accommodation.

Extensive locker rooms have been arranged so that at a nominal cost each student may have a locker for himself. Lockers will also be provided in connection with each of the large laboratories in which the student would be required to keep his own material, instruments, etc.—as for instance, in connection

with the dissecting room and the laboratories for Pathology and Bacteriology. In addition to the large reading room of the Library and the recreation room on the ground floor of the Laboratory wing, a small reading room is provided for the use of students and controlled by the Students' Medical Society, in which are kept the daily papers, periodicals, etc.

II.

Matriculation.

For particulars of the University Matriculation, see pp. 10–20.

Intending students are reminded that a University degree in Medicine does not always give a right to practice the profession of Medicine. It is necessary to conform with the Medical laws of the country or province in which it is proposed to begin practice. Each province in Canada at present has its special requirements for its license and in most provinces a special standard of general Education is insisted upon before beginning the study of Medicine.

The requirements for those who intend to practice in any of the provinces of Canada, or in Great Britain, etc., are as follows:—

A. General Council of Medical Education and Enregistration of Great Britain.

A license from this body entitles the holder to practice in England, Ireland, Scotland and all colonies except the various provinces in Canada. The Matriculation Examination in Medicine of this University, as described on pp. (14-20) is accepted by the General Medical Council. Graduates of this University desiring to register in England are exempted from any examination in preliminary education on production of the McGill Matriculation certificate. Certificates of this University for attendance on lectures, practical work and clinics are also accepted by the various examining boards in Great Britain. To obtain a licence from the General Council it is necessary for all Canadian graduates to pass one of the examining boards of Great Britain in both primary and final subjects.

Detailed information may be obtained from one of the three registrars: Henry E. Allen, B.A., 299 Oxford Street, London; W. J. Robertson, 54 George St., Edinburgh; S. W. Wilson, 35 Dowson St., Dublin.

B. The Province of Quebec.

No University Matriculation Examination is accepted by the College of Physicians and Surgeons of this Province. Graduates in Arts of any British or Canadian University are however exempted from examination on presentation of their Diplomas.



Laboratory of Physiology.

Those who pass the Preliminary Examinations described below, or Graduates in Arts who register as students in the C. P. & S., Quebec, *on beginning their studies in Medicine*, obtain on graduating from McGill University a license to practice in Quebec without further examination in any professional subject.

Graduates who have registered with the General Council of Great Britain are at present admitted to practice without examination.

The requirements for the Matriculation Examination of the Province of Quebec for 1903 are:—

LATIN.—Cæsar's Commentaries, Bks. IV., V., VI.—Virgil's Aeneid, Bks. V., VI.—Cicero *Pro Milone*, with a sound knowledge of the Grammar of the Language.

ENGLISH.—For *English-speaking* candidates.—A critical knowledge of one of Shakspere's plays, viz., The Merchant of Venice, for 1903, with English Grammar, as in Mason.

For *French-speaking* candidates.—Translation into French of passages from the first eight books of Washington Irving's Life of Columbus, with questions on grammar. Translation into English of extracts from Fénélon's Télémaque.

FRENCH.—For *French-speaking* candidates.—A critical knowledge of Racine's "Athalie" and La Fontaine's Fables, Bks. I., II., III., with questions on Grammar and Analysis.

For *English-speaking* candidates.—Translation into English of passages from Fénélon's Télémaque, with questions on Grammar. Translation into French of easy English extracts.

BELLES LETTRES AND RHETORIC.—Principles of the subject. History of the Literature of the age of Pericles in Greece, of Augustus in Rome, and of the 17th, 18th and 19th centuries of England, and France.

HISTORY.—Outlines of the History of Greece and Rome, and particular knowledge of the History of Britain, France and Canada.

GEOGRAPHY.—A general view, with particular knowledge of Britain, France and North America.

ARITHMETIC.—Must include Vulgar and Decimal Fractions, Simple and Compound Proportion, Interest and Percentages, and Square Root.

ALGEBRA.—Must include Fractions and Simultaneous Equations of the First Degree.

GEOMETRY.—Euclid, Bks. I., II., III., IV. and Book VI., or the portion of plane Geometry covered by those Books. Also the measurement of the lines, surfaces and volumes of regular geometrical figures.

CHEMISTRY.—Outlines of the subject as in P. Würtz, Troost, or Roscoe.

BOTANY.—Outlines as in Moyen, Provancher, Laflamme, or Spotton.

PHYSICS.—Outlines as in Peck-Ganot's Physics.

PHILOSOPHY.—Elements of Logic as in Jevon's Logic; Elements of Philosophy, as in Professor Murray's Hand-Book of Psychology.

The examinations will be held in September, 1903, at Quebec, and in June, 1904, at Montreal. Applications to be made to Dr. J. A. Macdonald, No. 1 Belmont Street, Montreal, or to Dr. C. R. Paquin of Quebec, who will furnish schedule giving text-books and percentage of marks required to pass in each subject.

Examination Fee, twenty dollars. Should the candidate be unsuccessful, one-half of the fee will be returned on first failure.

Of the four years' study, *after* having passed the Matriculation Examination, three six months' sessions, at least, must be attended at a University, College or Incorporated School of Medicine recognized by the "Provincial Medical Board." The first session must be attended during the year immediately succeding the Matriculation Examination, and the final session must be in the fourth year.

Students wishing to register degrees in Arts must do so before the 15th of September of the year in which they begin the study of Medicine in order to obtain a license as soon as they graduate from the University.

C. The Province of Ontario.

Everyone desirous of being registered as a matriculated medical student in the register of the College of Physicians and Surgeons of this Province, except as hereinafter provided, must present to the Registrar the official certificate of having passed the "Departmental Pass Arts Matriculation Examination," and in addition Physics and Chemistry—whereupon he shall be entitled to be so registered upon the payment of twenty dollars and giving proof of his identity.

Graduates in Arts of any University in His Majesty's dominions, are not required to pass this examination, but may register their names with the Registrar of the College, upon giving satisfactory evidence of their qualifications, and upon paying the fee of twenty dollars.

A certificate from the Registrar of any chartered University conducting a full Arts course in Canada, that the holder thereof matriculated prior to his enrolment in such University, and passed the examination in Arts prescribed for students at the end of the first year, shall entitle such student to registration as medical student under *The Ontario Medical Act.*

Every medical student, after mtriculating, shall be registered in the manner prescribed by the Council, and this shall be held to be the beginning of his medical studies, which shall date from that registration. To become a Registered Practitioner in this province four years' attendance at a recognized Medical School is required and a fifth year to be spent in hospital or laboratory work must elapse before the final examination is granted.

Students are examined in all the subjects of a medical curriculum by the Examining Board of the C. P. & S. of this province at three examinations, a primary (II. year), an intermediate (IV. year), and a final (V. year).

Full details may be obtained on application to Dr. R. A. Pyne, Registrar, Cor. Bay and Richmond Sts., Toronto.

D. The Province of New Brunswick.

The matriculation requirements of this province are:—

1. English Grammar, Composition, Literature and Rhetoric.
2. Arithmetic, including vulgar and decimal fractions, extraction of the square and cube root and mensuration.
3. Algebra, to the end of quadratic equations.
4. Geometry, first three books of Euclid.
5. Latin, first two books of Virgil's Æneid, or three books of Cæsar's Commentaries, translation and grammar.

6. ELEMENTARY MECHANICS of solids and fluids, comprising the elements of statics, dynamics and hydrostatics.

7. ELEMENTARY CHEMISTRY.

8. CANADIAN AND BRITISH HISTORY, with questions in modern geography.

9. TRANSLATIONS and grammar of any two of the following languages: *Greek*, *French* and *German*.

In order to pass, a candidate must make an average of sixty per cent., with a minimum of forty per cent. in any one subject.

Dr. Stewart Skinner, of St. John, N.B., is the Registrar of the Council of Physicians and Surgeons of this province, and will furnish details on application.

To become registered as a practitioner in this province it is now necessary to pass examinations in all the Professional Branches.

E. Province of Nova Scotia.

The regulations of the Provincial Medical Board of this province for 1902-1903 are as follows:

PRELIMINARY EXAMINATION AND REGISTRATION.

1. No person shall begin or enter upon the study of medicine, for the purpose of qualifying himself to practice the same in this province, unless he first produces to the Registrar a certificate from the examiners appointed by the Board to show that he has passed the Preliminary Examination in the subjects prescribed by the Rules and Regulations of the Board, or evidence of having passed such equivalent examination as is accepted by the Board, and unless he causes his name to be forthwith entered in the Medical Students' Register as hereinafter specified (Rule 15).

2. No candidate shall be admitted to the Preliminary Examination unless at least fourteen days previous to such examination he has given notice to the Registrar of the Board of his intention to present himself for such examination, and unless he has produced to the Registrar satisfactory evidence that he has completed his sixteenth year and has paid a fee of ten dollars ($10.00) to the Registrar.*

3. The Preliminary Examination † will embrace the following subjects, viz.:—

(1) ENGLISH. (a) *Language*: Grammar, Analysis, Parsing.
(b) *Rhetoric and Composition* including an essay on one of several set subjects from prescribed authors. ‡
(c) *Literature*: History of English Literature; critical study of prescribed authors. ‡

(2) ARITHMETIC. Complete.

(3) ALGEBRA. Simple Rules; Rules for the treatment of Indices; Surds; Extraction of Square and Cube Roots; Equations of the First Degree; Quadratic Equations of one unknown quantity.

(4) GEOMETRY. Euclid, Books I., II., III., with easy deductions.

(5) HISTORY AND GEOGRAPHY. British and Canadian History with questions in General Geography.

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* This fee shall not be returned in case of failure.

† For copies of previous examination papers ($1.00 one entire set) apply to Registrar Provincial Medical Board.

‡ English authors for 1903. DeQuincy, *Joan of Arc;* Tennyson, *The Princess;* Dickens, *Christmas Carol;* Scott, *Lady of the Lake.*

(6) LATIN. (a) *Translation* from prescribed books with questions arising out of those books, and translation of easy passages not taken from such books.*

(b) *Grammar.*

(c) *Composition.*

(7) One of the following:

GREEK. (a) *Translation* from prescribed books, with questions arising out of those books, and translation of easy passages not taken from such books. †

(b) *Grammar*, as in Elementary Grammars.

(c) *Composition*, as in Frost's Greek Primer.

FRENCH. *Translation* from prescribed books with *Grammar* Questions limited to the Accidence, and based upon the passages prescribed for translation. ‡

GERMAN. *Translation* and *Grammar*, as under French. ||

4. Examinations take place twice a year, beginning on the first Thursday in May and the last Thursday in August.

On the same dates local examinations will be held, on application, at Sydney, C.B., Pictou, N.S., and at Yarmouth, N.S. Candidates taking local examinations are required to pay an additional fee of $2.00.

5. Except where otherwise specified, the books prescribed by the Council of Public Instruction for the course leading to the grade B or High School Junior Leaving Examinations are recommended.

6. In order to pass, a candidate must make fifty per cent. of marks in each subject.

7. If fifty per cent. is made in all subjects but one, and if in that subject the candidate shall have made at least 25 per cent. he may begin study, and attend for one medical year at any medical college recognized by the Board, and thereafter present himself for examination in that subject alone, without payment of any additional fee, except in cases of candidates taking local examinations, who will be required to pay the usual $2.00 fee for such examination.

8. A candidate failing in more than one subject, or failing to make 25 per cent. in any subject, may not begin professional study; he will, however, at any subsequent examination, be exempted from all subjects in which he has already passed and shall for such examination pay an additional fee of $5.00, (or $7.00 if a local examination be taken).

9. Certificates will be issued to successful candidates, showing the subjects in which they have passed, and the extent to which their knowledge of these subjects was tested.

10. Candidates who have passed the above examination will be admitted without further preliminary examination at all Canadian and American Colleges.

11. This examination also satisfies the requirements of the General Medical Council of Great Britain as to the preliminary examination which must be passed by persons wishing to register as medical students, provided the candidate shall have passed in all subjects at one examination.

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* Latin for 1903. *Cæsar*, De Bello Gallico, Book V, with *Virgil*, Æneid, Book II.

† Greek for 1903. *Xenophon*, Anabasis, Book III.

‡ French for 1903. *Voltaire*, Charles XII, Books I, II, III.

|| German for 1903. *Buchheim*, German Reader, Part I.

EXEMPTIONS.

12. Graduates in Arts or Science of any recognized College or University, also persons who have passed the entrance examination of the Nova Scotia Barristers' Society, are not required to submit to this examination.

13. The Medical Board will also recognize *pro tanto* the following examinations:

(1) The Matriculation or the Sessional Examinations of any chartered University or College approved by the Board, including McGill University.
(2) The Examinations for Teachers' Licenses, Grade A or B of Nova Scotia, with 50 per cent. in required subjects.
(3) The Examinations for Junior or Senior High School Leaving Certificates of Nova Scotia, with 50 per cent. in required subjects.
(4) The Examinations for Honour, First or Second Class Ordinary Diplomas, as issued by the Prince of Wales College, P.E.I., with 50 per cent. in required subjects.
(5) The Examinations for First or Second Class Teachers' Licenses of Prince Edward Island, with 50 per cent. in required subjects.
(6) The Examinations for First Class, or Grammar School Licenses of New Brunswick, with 50 per cent. in required subjects.
(7) The Examinations for corresponding Licenses or Leaving Examination Certificates issued by the Education departments of the other provinces of Canada, with 50 per cent. in required subjects.
(8) The Matriculation or Preliminary Examinations of any Medical Licensing Board or Council authorized by law in His Majesty's Dominions, with 50 per cent. in each subject.

14. After passing his preliminary examination, the medical student may then enter upon his professional course at any University, Medical School or College approved by the Board.

REGISTRATION.

15. *Immediately* after entering upon his course every person engaged in the study of medicine for the purpose of qualifying himself to practice in the Province of Nova Scotia shall forthwith cause to be entered in the register of the Board kept by the Registrar, and called the Medical Students' Register, his name, age, place of residence, date and particulars of his preliminary examination, and place and date of his commencement of the study of Medicine.

16. The fee for such registration is ten dollars ($10.00), except that candidates who already have paid $10.00 for the Matriculation Examination are not required to pay any additional fee.

17. Every student must spend a period of at least four years in actual professional study subsequent to his having passed the preliminary or Matriculation Examination and being registered as a medical student; and the prescribed period of study shall include four collegiate sessions of at least eight months duration each year.

18. Professional examinations will be held twice during the year, one beginning in the *month of April*, the other in *September*.

19. Notwithstanding the Regulations (Chap. III.—Professional Examinations) during the year 1902 and until further notice, any candidate for the License of the Board who produces to the Registrar satisfactory certificates of having passed in the subjects of first and

second Professional Examinations at a regular Medical College or University recognized by the Board, will be exempted from further examinations in such subjects, and shall be required to pass only the subjects of the third Professional Examination (Chap. III., Sec. 16-22).

The fee for the third Profesional Examination under the above conditions will be thirty-five dollars ($35.00), which will entitle successful candidates to the benefits of Chap. III., Sec. 22 equally and to the same extent as is provided in said section for candidates who have taken all the examinations and paid the usual fees.

20. Any person who produces to the Registrar satisfactory evidence to show that as a student in Arts or Science connected with any recognized University or College, he has attended a satisfactory course in Physics, Chemistry or Practical Chemistry, previous to his registration as a medical student, such course or courses will be accepted by the Board as exempting from further attendance in such subject or subjects and a certificate of having as such Arts or Science Student previous to his registration or as a regular medical student subsequent to such registration, passed an examination in either or all of these subjects equivalent to that required by the Board, will be accepted as exempting from further examination in any or all of said subjects.

21. With regard to hospital attendance the requirement has been reduced from twenty-four to eighteen months, and six months attendance on the out-patient department of a general hospital or on the practice of a recognized dispensary will be accepted as an equivalent portion of such eighteen months.

NOTICE.

The attention of Graduates in Medicine who may be thinking of registering in the Province of Nova Scotia is called to the fact that notwithstanding the requirements of the recent Medical Act, Chap. 103, R.S. (N. S.), 1900, any person who at any time before the first day of July, A.D. 1899, commenced the study of medicine for the purpose of qualifying himself to practice the same in this Province, *and who at any time before the first day of July, A.D. 1902, complies with the conditions and provisions in that* behalf contained in the revised statutes, fifth series, Chapter twenty-five, and Acts in amendment thereof, and in the rules and regulations made thereunder and now in force, shall be entitled to registration under this Chapter, 1889, c. 32, s. 39, (2).

A. W. H. LINDSAY,
Reg. and Sec'y. P. M. Bd., N. S.

Prince Edward Island.

The requirements of this province are the same as for New Brunswick and there is reciprocity with both New Brunswick and Nova Scotia.

The subjects of the examination are as follows:—

1. ENGLISH GRAMMAR, COMPOSITION, LITERATURE AND RHETORIC.

2. ARITHMETIC, including vulgar and decimal fractions and extraction of the square and cube root and mensuration.

3. ALGEBRA, to the end of quadratic equations.

4. GEOMETRY, first three books of Euclid.

5. LATIN, first two books of Virgil's Æneid, or three books of Cæsar's Commentary, translation and grammar.

6. ELEMENTARY MECHANICS of solids and fluids, comprising the elements of statics, dynamics and hydrostatics, and elementary chemistry.

7. CANADIAN AND BRITISH HISTORY, with questions in modern geography.

8. TRANSLATION and grammar of any two of the following subjects: *Greek, French, German.*

Fifty per cent. of the marks in every subject shall be required for a pass, and 75 per cent. for honours.

Province of Manitoba.

The matriculation examination of McGill University is accepted by this province. The province holds an examination twice per year. The following are the fixed requirements:—(1) LATIN, (2) MATHEMATICS, (3) ENGLISH, (4) HISTORY, (5) BOTANY, (6) PHYSICS. Subjects 1, 2, 3, 4 the same as required for the Arts Matriculation of Manitoba University, Parts I. and II., and the same standard shall be required to enable the candidate to pass.

Details of this examination can be obtained from the Registrar of the University of Manitoba.

British Columbia.

The College of Physicians and Surgeons of the province does not hold an examination in general education but accepts the examinations recognized by the various boards and universities of the Dominion.

This province examines all candidates for a license in the professional branches ,both primary and final. For dates of these examinations see almanack at beginning of the Medical Calendar. Dr. C. J. Fagan, Victoria, B.C., is the Registrar and Secretary of the Council.

North-West Territories.

The College of Physicians and Surgeons of the North-West Territories has no standard of matriculation. It accepts that of any Canadian Board or University.

According to the Amended Medical Ordinances (1900), a licentiate of any province in Canada may register and practice in the North-West Territories on payment of the special fee and without examination. The College reserves th right of examining graduates of all Universities.

J. D. Lafferty, M.D., Calgary, Alberta, is the Registrar. The dates fixed for examinations will be found in the almanack.

Newfoundland.

The Newfoundland Medical Board has a standard of preliminary education equivalent to that required by the General Council of Medical Education of Great Britain.

The examinations for 1902-03 will consist of:—

Compulsory.

ENGLISH LANGUAGE.—Including grammar, composition and literature.
ARITHMETIC.—Including vulgar and decimal fractions, and the extraction of the square root.
ALGEBRA.—To the end of simple equations.
GEOMETRY.—Euclid, books i, ii, iii, with easy questions on the subject matter of the same.
LATIN.—Including grammar, translation from specified authors, and translation of easy passages not taken from such authors. †
ELEMENTARY MECHANICS of Solids and Fluids. ‡

Optional. §

HISTORY OF BRITISH AMERICA.—With questions in modern geography.
HISTORY OF ENGLAND.—With questions of modern geography.
FRENCH.—Translation and grammar.
GERMAN.—Translation and grammar.
GREEK.—Translation and grammar. ||
MAGNETISM AND ELECTRICITY.
CHEMISTRY.

(*a*) The Board will not, in future, accept any certificate of passing the matriculation or preliminary examination in general education, unless the whole of the subjects included in the matriculation or preliminary examination required by the Council for registration of students of medicine have been passed at the same time.

(*b*) Provided that a certificate of having passed a University examination required for graduation in Arts, or a senior or a higher local University examination, or an Intermediate grade examination of the Council of Higher Education of Newfoundland, or of the Grade I. license for teachers of Newfoundland, wherein the specified subjects of general education are included, may be recognized for the purpose of registration.

In order to pass a candidate must make fifty per cent. of marks in each subject.

Certificates will be issued to successful candidates showing the subjects in which they passed, and the extent to which their knowledge of these subjects was tested.

Candidates who have passed the above examination will be admitted without further preliminary examination at all Canadian and American Colleges.

TEXT-BOOKS.—Except when otherwise specified the books prescribed by the Council of Higher Education are recommended.

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† Latin for 1903. *Cæsar* Gallic War, Book I, or *Virgil*, Æneid Book I.

‡ As in Blackie's Elements of Dynamics, or an equivalent.

§ In communicating with the Registrar, students will please state the optional subject chosen.

|| Greek for 1903, *Xenophon*, Anabasis, Book I; or Hellenica, Book I

III.

TIME TABLES FOR SESSION 1902-1903.

Time Tables for the Session of 1903–1904 will be issued to each student with his ecture Room ticket enregistration.

TIME TABLE OF FIRST YEAR.

LECTURES.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Lecture Theatre.
Anatomy Demonstrations...	9	9	9	9	9	.....	Anatomy Demonstration theatre.
Physiology.	4	4	.....	4	3	.....	Winter & Spring Terms No. 1.
Chemistry.....	2	.....	2	2	.....	.....	Autumn Term No. III.
	.....	2	2	2	.....	.....	Winter & Spring Terms No. III.
Biology	.....	2	.....	.....	2	.....	Autumn Term Redpath Museum.
Bacteriology.....	3	.....	.....	.....	.....	.....	Spring Term No. I.
LABORATORY WORK.							
Practical Anatomy.....	10–1	10–1	10–1	10–1	10–1	9–1	Aut. & Win. Terms
Prac. Physiology.....	2–4	.....	3–5	.....	.....	.....	Win. & Sp. Terms.
Prac. Histology.....	.....	.....	4–6	.....	4–6	9–12	Win. & Sp. Terms.
Prac. Chemistry.....	10–12	10–12	10–12	10–12	10–12	9–11	Winter Term.
Prac. Biology.....	.....	3–6	.....	.....	3–6	.....	Biological Laboratory, Arts Bld'g. Autumn Term.
Prac. Bacteriology.....	3–5	.....	.....	.....	3–5	.....	Spring Term.

* Class taken in divisions.

TIME TABLE OF SECOND YEAR.

LECTURES.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Lecture Theatre.
Anatomy	9	9	9	9	9	.....	Autumn & Winter Terms No. II.
Physiology.....	2	.....	2	.....	2	.....	No. I.
Chemistry	3	.....	3	.....	3	.....	No. III.
Pharmacology and Therapeutics....	4	.....	4	.....	.....	.....	No. II.
LABORATORY WORK.							
Practical Anatomy.....	10–1	10–1	10–1	10–1	10–1	10–1	Autumn & Winter Terms.
Prac. Chemistry.....	9–11	9–11	9–11	9–11	9–11	9–11	Spring Term.
Prac. Physiology.....	.....	2–5	.....	2–5	.....	.....	Throughout Session.
Prac. Histology.....	.....	4–6	.....	4–6	.....	9–12	Autumn Term.
Demonstrations and Laboratory Work, Pharmacology....	.....	2–4	.....	2–4	.....	.....	Throughout Session.

† Half the class only.

NOTE.—Students of the second year are required to attend Medical and Surgical Clinics and Demonrations at M. G. H. and R. V. H. spring term in groups.

Certificates required for graduation.

TIME TABLE OF THIRD YEAR.

LECTURES.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Lecture Theatre.
Obstetrics and Gynæcology.	9	....	9	.....	....	.....	No. III
Medicine	.....	10	*11-12	10	.....	.....	No. IV
Surgery	10	.....	*12-1	.....	10	.....	No. IV
Jurisprudence	11	.....	.....	11	.....	.....	Fall&W. Term No.I
Pharmacology and Therapeutics	.....	9	.....	9	.....	.....	No. III
General Pathology and Bacteriology	.....	.....	10	.....	....	9	Win. & Sp. No. III
	.....	.....	9	.....	9	.....	Aut. Term No. III
Hygiene	9	.....	4	.....	....	.....	Win. { Mon. 11 } S / { Thur. 11 } T
* Morbid Anatomy.....	.....	.....	.....	.....	.....	§10-15	Win. & Sp. Term.
Clinical Medicine.....	2 RVH	1 p.m. MGH	.....	2 p.m. RVH	1 MGH	.....	
Clinical Surgery..... ...	1 MGH	2 RVH	.....	1 MGH	2 p.m. RVH	.....	
Practical Pathology.....	4-6	4-6	.....	4-6	4-6	....	Winter Term, Path. Lab.
‡ Clinical and Sanitary Chemistry.....	4-6	4-6	....	4-6	4 6	.....	Autumn Term, Chem. Lab.
‡Bacteriology.....	4-6	4-6	.....	4-6	4-6	.....	Autumn Term, Path. Lab.
‡Clinical Microscopy.....	4-6	4-6	.....	4-6	4-5	.. ....	Spring Term, Path. Lab.
‡†Operative Surgery.....	5-6	5-6	5-6	5-6	5-6	5-6	Dissecting Room, Spring Term.

* Alternate weeks, M.G.H. and R.V.H. † Optional. ‡ Classes taken in groups.
§ Weekly for alternate months R.V.H. and M.G.H.

TIME TABLE OF FOURTH YEAR LECTURES AND CLINICS.

LECTURES.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Lecture Theatre.
Obstetrics and Gynæcology .	.... ..	9	9	9	9	.....	No. IV
Medicine.....	.....	10	‡11 12	10	.....	.....	No. III
Surgery.....	10	.....	‡12-1	.....	10	.....	No. III
Med. and Sur. Pathology....	9	.....	.....	.....	.. ....	.....	No. IV
Ophthalmology.....	.....	.. ....	5	.. ..	.....	.....	No. IV
Medical and Surgical Anatomy.....	5	... ...	.....	.....	.....	.....	Autumn Term No. IV
Children's Diseases.....	.....	.....	.....	.....	5	.....	Win. Term No. IV
*Out Patients' Clinics.....	11-12	11-12	11-12	11-12	11-12	11-12	M. G. H.
	12-1	12-1	.....	12-1	12-1		R. V. H.
Clinical Medicine.....	... ...	1	.....	.....	1	.....	R. V. H.
	1	.....	.....	1	.....	.....	M. G. H.
Clinical Surgery.....	.....	1	.....	.....	1	.....	M. G. H.
	2	. ....	... .	2	.....	.....	R. V. H.
Gynæcological Operations.	....	.....	4	.....	.....	.....	M. G. H.
	.....	11	.....	.....	.....	.....	R. V. H.
*Clinical Ophthalmology...	3	....	3	.....	... ...	.....	M. G. H.
	.....	3.30	.....	.....	3.30	.....	R. V. H.
†Gynæcological Clinics....	.... ..	4	.....	4	.....	.....	M. G. H.
	.....	3	.....	3	.....	11	R. V. H.
Morbid Anatomy.....	.... ..	.....	.....	.....	.....	§9-11	Maternity Hospital.
Clinical Obstetrics.....	.... ..	.....	.....	.....	.....	1-2.30	
Dermatological Clinic.....	.....	.....	2	.....	.....	11	M. G. H.
*Genito-Urinary Clinic.....	....	.....	.....	.....	... ...	3	R. V. H.
Diseases of Children Clinic..	4	.....	.....	4	.....	.....	M. G. H.
*Laryngology.....	4	. ...	.....	.....	4	.....	M. G. H.
	.....	3	.....	.. ....	3	.....	R. V. H.

* In groups of eight or ten. † In groups of four. ‡ Alternate weeks M.G.H. and R.V.H.
§ Weekly for alternate months M.G.H. and R.V.H.

IV.

COURSES OF LECTURES.

The Corporation of the University on the recommendation of the Faculty of Medicine, in 1894, consented to the extension of the courses of lectures in medicine over a period of about nine months instead of six.

By this means, (1) The students of the primary years have a more ample opportunity of becoming acquainted, by laboratory work, with those branches of study which form the scientific basis of their profession, and (2) the final students will be enabled to utilize to better advantage the abundance of clinical material provided in the two Hospitals.

By this arrangement the actual number of didactic lectures per session was decreased, but a corresponding increase was made in the amount of tutorial work and individual teaching in the laboratories for Chemistry, Physiology, Anatomy, Pathology, and Bacteriology, as well as giving more time for clinical work in the Royal Victoria and Montreal General Hospitals, and a greater number of ward classes were also made possible during the session.

The Faculty expects, by thus increasing the time that the different professors, lecturers and demonstrators devote to each student, to accomplish two very important ends: first, to do away with the injurious effects which result from attempting to condense the teaching of medicine and surgery into four or even five sessions of six months; second, to give each student a sounder and more thoroughly practical knowledge of his profession than could be obtained by attending during even five sessions of six months each.

Anatomy.

PROFESSOR:—FRANCIS J. SHEPHERD.
LECTURER, APPLIED ANATOMY:—J. A. SPRINGLE.
LECTURER AND SENIOR DEMONSTRATOR:—J. G. McCARTHY.

DEMONSTRATORS:—
R. TAIT McKENZIE.
J. A. HENDERSON.
J. J. ROSS.
A. E. ORR.

ASSISTANT DEMONSTRATORS:—
R. A. WESTLEY.
H. M. CHURCH.
A. T. BAZIN.
A. MACKENZIE FORBES.

Anatomy is taught in the most practical manner possible, and its relation to Medicine and Surgery fully considered. The lectures are illustrated by the fresh subject, moist and dry preparations, sections, models, plates and drawings on the blackboard. Frequent examinations are also held.

A course of practical demonstrations in Medical, Surgical and Topographical Anatomy is also given in the final year of the course.

The department of *Practical Anatomy* is under the direct control and personal supervision of the Professor of Anatomy, assisted by his staff of Demonstrators.

The methods of teaching are similar to those of the best European schools, and students are thoroughly grounded in this branch.

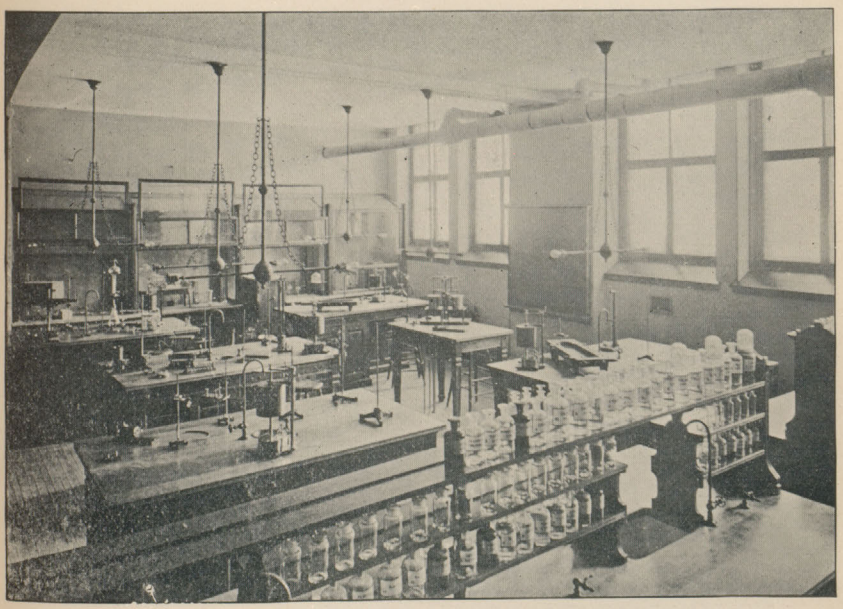
Every student must be examined *at least* three times on each part dissected, and no certificate is given unless the examinations are satisfactory.

Special Demonstrations on the brain, thorax, abdomen, bones, etc., are frequently given. Prizes are awarded at the end of the Session for the best examination on the fresh subject.

The Dissecting Room is open from 9 a.m to 6 p.m. In consequence of the excellent Anatomy Act of the Province of Quebec, abundance of material can always be obtained.



Medical Buildings.—Laboratory of Chemistry.



Laboratory of Pharmacology.

Chemistry.

PROFESSOR:—R. F. RUTTAN.
DEMONSTRATOR:—J. R. ROEBUCK.
ASSISTANT DEMONSTRATORS:— W. K. BROWN. H. D. IRVINE.
LABORATORY ASSISTANT:—R. O. MABEE.

The Department of Medical Chemistry is situated on the ground floor of the laboratory wing of the new building. The Students' Laboratory, 80 by 45 feet, with ceiling 22 feet high, has recently been completely equipped, and has benches and sets of apparatus for 180 students. Adjoining this Laboratory is a smaller one for post-graduate teaching in medical chemistry and for advanced work, and a balance room in which is a reference library for the use of the staff and graduates employed in special work.

The lecture room for chemistry on the opposite side of the hall has four rooms connected with it, in which lecture experiments are prepared, and which are used for storing apparatus, preparations, etc., required for the lectures on chemistry and physics.

The course in medical chemistry is a graded one.

First Year:—During the autumn term of the first year a short course of lectures in medical physics is given. These lectures are fully illustrated by experiments. The students, taken in groups, are required to study by experiments in the laboratory the more important phenomena of heat, sound, light and electricity. Lectures and demonstrations on the principles of chemistry are given three times per week during the winter and spring terms. Examinations are held at Christmas on medical physics, and in June on the theory of chemistry.

Laboratory instruction in practical chemistry is given during the winter term, six hours per week. This course includes the experimental study of the laws of chemical action, the properties of typical elements and compounds, and a short course in qualitative analysis. Special attention is directed to instructing the students in keeping an accurate record of his observations and conclusions. These notes are examined daily and criticised.

Second Year:—A course of lectures and demonstrations, three per week, is given on Organic Chemistry in the autumn

term, and an examination is held at Christmas. During the winter and spring terms lectures and demonstrations are given on the application of chemistry to clinical diagnosis, sanitation and medical jurisprudence.

Laboratory work in clinical and applied medical chemistry is required during the spring term. An examination in applied medical chemistry, practical and theoretical, is held in June.

Students will find it greatly to their advantage to have a knowledge of elementary chemistry before entering upon the study of medicine. Graduates in arts of recognized universities, on presenting certificates of having taken courses in theoretical and practical chemistry and physics, and of having passed examinations in the same, may be exempted from the chemistry of the first year.

Physiology.

THE JOSEPH MORLEY DRAKE PROFESSOR:—WESLEY MILLS.
LECTURER:—W. S. MORROW.
DEMONSTRATORS:— A. A. ROBERTSON. A. H. GORDON.

The purpose of this course is to make students thoroughly acquainted, as far as time permits, with modern Physiology; its methods, its deductions and the basis on which the latter rest. Accordingly a full course of lectures is given, in which the physical, the chemical, and other aspects of the subject receive attention.

In addition to the use of diagrams, plates, models, etc., every department of the subject is illustrated experimentally. The laboratory work for students has been greatly increased and during the season of 1901-1902 apparatus to the value of over three thousand dollars was added to the students' laboratory.

Laboratory work for Senior Students:—

(1.) During a part of the Session there will be a course on Physiological Chemistry, in which the student will, under direction, investigate food stuffs, digestive action, blood, and the more important secretions and excretions, including urine. All the apparatus and material for this course will be provided.

(2.) The remainder of the Session will be devoted to the performance of experiments (other than chemical) to illustrate important physiological principles.

Laboratory work for Junior Students:—

This will be somewhat similar to the course for Senior students, but simpler and anatomico-physiological rather than chemical; like the work for Second Year Students its main object will be the illustration of principles.

The new Physiological Laboratory has been fitted up so as to permit of eighty students engaging in work at one time. The fittings and equipments of each bench are of the latest designs and are well adapted to their purpose. The apparatus was especially made by the best American and European makers and thoroughly tested before being accepted.

Each pair of students is supplied with all the apparatus necessary to carry out the work of verifying a large number of the leading principles of physiology and registering the results by the graphic method.

Provision is also made for a course in Physiological Chemistry, covering foodstuffs, digestion, the animal fluids, etc.

The experience of the past session has fully justified expectations in regard to the Laboratory and the courses prescribed.

For the purposes of group and class demonstration, other and more complicated apparatus is available, and will be added to as necessity requires.

Additional rooms are provided, seven in number, for a departmental library and professor's office, for preparation apartments, and workshop, and for physiological research.

Histology.

PROFESSOR:—GEO. WILKINS.
LECTURER:—N. D. GUNN.
DEMONSTRATORS:— { HUGH B. FRASER. / WALTER B. FISKE.
ASSISTANT DEMONSTRATOR:—H. B. CUSHING.

The teaching of Histology and Microscopical Methods is spread over two years. During both years practical instruction will be given upon the preparation and mounting of specimens. Students will also be required to make drawings of the specimens prepared by them.

For the First Year students, work will commence immediately after the Christmas holidays and continue until the end of the session. The course will consist of laboratory work and demonstrations, with occasional lectures upon elementary and

systematic histology up to and including the digestive system. At the end of the session a practical examination will be held on the work done.

During the Second Year a course of demonstrations and laboratory work together with lectures will be given on more advanced histology and an examination held at Christmas.

Pharmacology and Therapeutics.

PROFESSOR:—A. D. BLACKADER.
LECTURER:—J T. HALSEY.
DEMONSTRATOR:—R. A. KERRY.

The lectures on this subject are graded in the following manner:—For students of the Second Year, there is (1) a three months' course on Practical Materia Medica and Pharmacy, with demonstrations and exercises in the laboratory. Prescription writing and the various modes of administering drugs are explained and illustrated; (2) a six months' course on the physiological action of drugs, with practical demonstration of the action of the more important ones. In the Third Year attention is directed to the Therapeutic Application of all the more important drugs and remedial measures, including Electricity, Hydrotherapy and Climatotherapy.

The Eddie Morrice Laboratory, comprising pharmacological and chemical research rooms, has, through the liberality of Mr. Morrice, been fully equipped, and in it during the session 1903-1904 an optional course of practical exercises in pharmacology will be given to advanced students.

Medicine.

PROFESSOR:—JAMES STEWART.
ASSISTANT PROFESSORS:— F. G. FINLEY. H. A. LAFLEUR. C. F. MARTIN.

While the lectures on this subject are mainly devoted to Special Pathology and Therapeutics, no opportunity is lost of illustrating and explaining the general laws of disease. With the exception of certain affections seldom or never observed in this country all the important internal diseases of the body, except those peculiar to women and children, are discussed, and their Pathological Anatomy illustrated by the large collection of morbid preparations in the University Museum, and by fresh specimens contributed by the Professor of Pathology.

The College possesses an extensive series of plates and models illustrative of the histological and anatomical appearances of disease, and the wards of the General and Royal Victoria Hospitals afford the lecturers ample opportunities to refer to living examples of very many of the maladies described, and to demonstrate the results of treatment.

Clinical Medicine.

PROFESSOR:—JAMES STEWART.
ASSOCIATE PROFESSORS:—F. G. FINLEY AND H. A. LAFLEUR.
ASSISTANT PROFESSOR:—C. F MARTIN.
LECTURERS:— G. GORDON CAMPBELL. W. F. HAMILTON.
DEMONSTRATOR:—S. RIDLEY MACKENZIE.

The instruction in Clinical Medicine is conducted in the theatres, wards, out-patient rooms and laboratories of the Royal Victoria and Montreal General Hospitals.

The courses include:—

I. The reporting of cases by every member of the Graduating Class, a certain number of cases being assigned to each student.

II. Bedside instruction for members of the Graduating Class.

III. Clinics weekly in each hospital.

IV. Tutorial instruction for the Junior Classes, in the wards and out-patient rooms of both hospitals.

V. Instruction in Clinical Chemistry and Bacteriology.

Surgery.

PROFESSOR:—THOMAS G. RODDICK.
ASSISTANT PROFESSOR:—J. M. ELDER.
LECTURER:—A. E. GARROW.

This course consists of the principles and practice of Surgery and Surgical Pathology, illustrated by a large collection of preparations from the Museum, as well as by specimens obtained from cases under observation at the hospitals. The greater part of the course, however, is devoted to the Practice of Surgery, in which attention is constantly drawn to cases which have been observed by the class during the session. The various surgical appliances are exhibited, and their uses and application explained. Surgical Anatomy and Operative Surgery form special departments of this course.

Clinical Surgery.

PROFESSOR:—JAMES BELL.
ASSOCIATE PROFESSOR:—GEORGE E. ARMSTRONG.
LECTURERS:— A. E. GARROW. J. A. HUTCHISON. J. M. ELDER.
DEMONSTRATOR:—KENNETH CAMERON.

The teaching in Clinical Surgery is conducted at the Montreal General and Royal Victoria Hospitals.

I. In the amphitheatre of each of these hospitals, demonstrations are given and operations are performed before the Senior and Junior Classes on alternate days.

II. Small ward classes of about ten men in each are taken through the wards by the surgeon in attendance, and instruction given at the bedside concerning the nature and management of surgical cases, in each hospital, at least once per week. Similar classes are also taken into the wards daily by the Surgical Assistants for instruction in diagnosis and reporting.

III. Beds are assigned to students in rotation, and each student is required to carefully study and report cases and to assist in the surgical dressing of the same. Certificates of case reporting are given, and are essential to graduation.

IV. In the Out-patient department students have an exceptionally good opportunity to study a great variety of injuries, to witness operations in minor surgery, to come into personal contact with patients and to take part in the application of a variety of surgical dressings and appliances.

Obstetrics and Diseases of Infants.

PROFESSOR:—J. CHALMERS CAMERON.
LECTURER:—D. J. EVANS.
DEMONSTRATOR:—JAMES BARCLAY.
ASSISTANT DEMONSTRATOR:—H. R. D. GRAY.

This course will embrace: (1) Lectures on the principles and practice of the obstetric art, illustrated by diagrams, fresh and preserved specimens, the artificial pelvis, complete sets of models illustrating the deformities of the pelvis, wax preparations, bronze mechanical pelvis, etc. (2) Bedside instruction in the Montreal Maternity, including external palpation, pelvimetry, the management and after-treatment of cases. (3)

A complete course on obstetric operations with the Tarnier-Budin phantom. (4) The diseases of infancy. (5) A course of individual clinical instruction at the Montreal Maternity.

The course is carefully graded and instruction is given separately to students of the Third and Fourth Years.

Particular attention is given to clinical instruction, and a clinical examination similar to that held in Medicine and Surgery, now forms an important part of the Final examination.

A short course of lectures on diseases of infancy is given, supplemented by clinical demonstration and ward work. The demonstrators give special demonstrations from time to time and take the students in groups for the purpose of examination and review.

Gynæcology.

PROFESSOR:—WM. GARDNER.
LECTURERS:—F. A. M. LOCKHART AND W. W. CHIPMAN.
DEMONSTRATOR:—J. D. CAMERON.

The didactic course is graded, and consists of from forty to forty-five lectures given at intervals alternating with the lectures on Obstetrics and extending throughout the session. The anatomy and physiology of the organs and parts concerned are first discussed. Then the various methods of examination are fully described, the necessary instruments exhibited, and their uses explained.

The diseases peculiar to women are considered as fully as time permits, somewhat in the following order:—Disorders of Menstruation; Leucorrhoea; Diseases of the External Genital Organs; Inflammations, Lacerations and Displacements of the Uterus; Pelvic Cellulitis and Peritonitis and Inflammation of the Ovaries and Fallopian Tubes; Benign and Malignant growths of the Uterus; Tumours of the Ovary; Diseases of the Bladder and Urethra. The lectures are illustrated as fully as possible by drawings and morbid specimens.

Clinical teaching, including out-patient and bed-side instruction is given at both the Royal Victoria and Montreal General Hospitals by Professor Gardner and Doctors Lockhart, Chipman and Cameron. A large amount of Clinical material is thus available for practical instruction in this department of medicine. Numerous operations are done before the class and made the subject of remarks. In addition to the ward-

patients, each hospital conducts a large out-patient Gynaecological Clinic, to which advanced students are admited in rotation, and instructed in digital and bi-manual examination and in the use of instruments for diagnosis.

Particular attention is thus given to Clinical instruction, and a Clinical examination in Gynaecology similar to that held in Medicine and Surgery, now forms part of the Final examination.

Medical Jurisprudence.

PROFESSOR:—GEO. WILKINS.

This course is treated of in its medical as well as medico-legal aspects. Special attention is devoted to the subject of blood stains, the chemical, microscopical and spectroscopic tests for which are fully described and shown to the class. The various spectra of blood in its different conditions are shown by the microspectroscope, so well adapted for showing the reactions with exceedingly minute quantities of suspected material. Recent researches in the diagnosis of human from animal blood are alluded to. In addition to the other subjects usually included in a course of this kind, Toxicology is taken up. The modes of action of poisons, general evidence of poisoning and classification of poisons are first treated of, after which the more common poisons are described, with reference to symptoms, post-mortem appearance and chemical tests. The post-mortem appearances are illustrated by plates, and the tests are shown to the class.

Ophthalmology and Otology.

PROFESSOR:—F. BULLER.

LECTURERS:— J. J. GARDNER.
J. W. STIRLING.

DEMONSTRATOR:—W. G. M. BYERS.

This will include a course of from twenty-five to thirty didactic lectures on Opthalmology and Otology, delivered at the college buildings. In these will be discussed especially the methodical, clinical examination of the organs of sight and hearing, the classification and pathology of the diseases affecting them, and the general principles underlying the diagnosis and treatment of affections of the eye and ear.

Systematic clinical instruction will be given at the bi-weekly clinics in the out-patient departments of the General and Royal Victoria Hospitals where students have unexcelled opportunities for thoroughly grounding themselves in the work of these branches. The operative work of eye and ear surgery is fully open to undergraduates on days set apart for the purpose, and special courses for instruction in refractive work and the use of the opthalmoscope can also be arranged for times convenient to the teachers and students.

Biology.

D. P. PENHALLOW:—PROFESSOR OF BOTANY.
E. W. MACBRIDE:—PROFESSOR OF ZOOLOGY.

The course in elementary Biology is designed to prepare for special study in medical subjects. Under the supervision of the professors of Botany and Zoology it will be given during the autumn term—Zoology first eight weeks; Botany last four weeks.

A.—Animal Biology.

In this course the fundamental properties of protoplasm will be discussed; the principles of the formation of tissues; the formation of organs; an outline of vertebrate structure and function, as exemplified by Paramoecium and Vorticella, Hydra, Lumbricus and the Dog-fish.

Two lectures and one laboratory period each week.

An optional course in Embryology, especially designed for medical students, is given by the Professor of Zoology, and is open to the students of the Medical Faculty.

B.—Plant Biology.

The course in Plant Biology will deal chiefly with the general properties of cytoplasm; the structure and nature of the plant cell; movement; nutrition; respiration; fixation of carbon; division of labor and origin of organs; evolution of plant forms. These principles will be illustrated in their more simple forms by a Myxomycete, Pleurococcus, Spirogyra and Oedogonium, Fucus, Saccharomyces and Pteris.

Two lectures and one demonstration each week, beginning on Monday, November 23rd, 1903.

Pathology and Bacteriology.

PROFESSOR:—J. G. ADAMI.
LECTURER:—A. G. NICHOLLS.

FELLOWS:— G. A. CHARLTON. H. W. THOMAS. LEO LOEB.

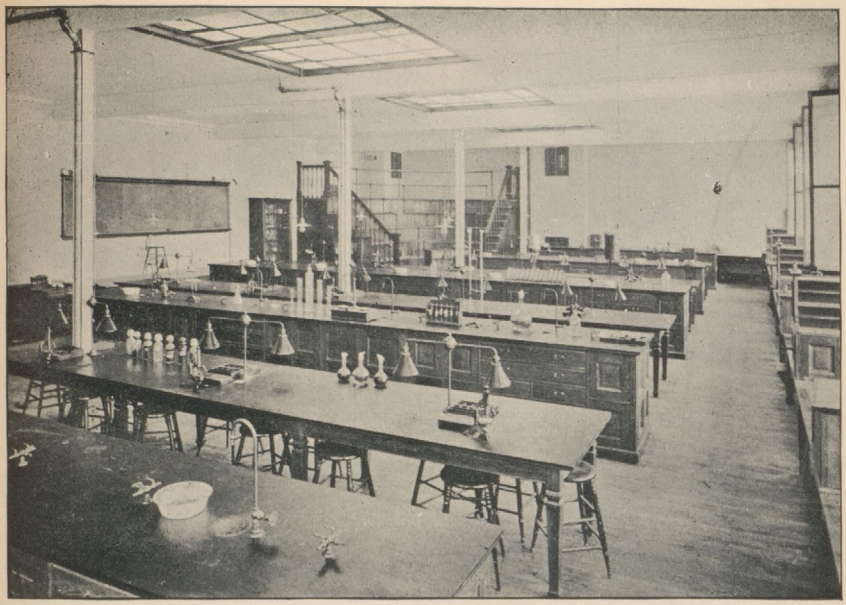
DEMONSTRATORS IN PATHOLOGY:— D. P. ANDERSON. J. MCCRAE. D. D. MACTAGGART.

DEMONSTRATOR IN BACTERIOLOGY:—H. B. YATES.
DEMONSTRATOR IN NEUROPATHOLOGY:—D. A. SHIRRES.
ASSISTANT DEMONSTRATOR IN PATHOLOGY:—E. A. ARCHIBALD.
ASSISTANT DEMONSTRATOR IN BACTERIOLOGY:—J. A. WILLIAMS.

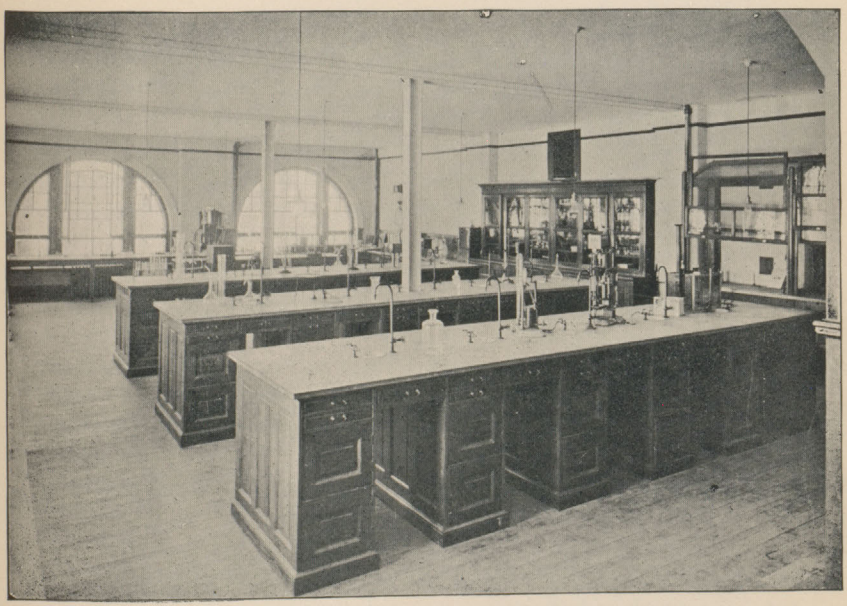
The teaching, both didactic and practical, in the subjects of Pathology and Bacteriology, are given by the Professor of Pathology and his staff.

For the use of this Department an extensive series of laboratories has been set aside and are now in active use on the top floor of the new wing of the Faculty, and inasmuch as the old Pathological Laboratory was established and equipped by the late J. H. R. Molson, these new laboratories retain the name of the J. H. R. Molson Laboratories.

They consist of a large and admirably lighted class room for general classes capable of accommodating with ease 70 students at a time, so arranged that each student in the bacteriological and pathological courses does the microscopical work at one table and immediately behind him is his locker and bench for the preparation of material, preparation of culture media, etc. In this room at one end there is also a small demonstration theatre or quarter circle capable of accommodating the whole class at work in the laboratory at one time and used for demonstration purposes, and at the other end a service department from which are given out materials. Further arrangements are installed for lantern demonstrations for the whole class. The large laboratory is so arranged that the students can perform their practical work with the least amount of moving about the room, the students working in pairs and having all the necessary apparatus, reagents, etc., immediately by them.



Laboratory of Pathology and Bacteriology.



In the Laboratory of Hygiene.

The following courses constitute the teaching in these subjects:—

1. A course of General Pathology for the students of the Third Year; optional for those of the Fourth Year. Lectures are delivered twice weekly throughout the winter and spring terms.

2. A course of Elementary Bacteriology for students of the First Year—eight lectures with demonstrations being given during the spring term.

3. A course of lectures upon Bacteriology in Relation to Disease, for students of the Third Year, given three times weekly during the autumn term.

4. A course of Demonstrations in the Performance of Autopsies to students of the Third Year. The demonstrations are held weekly from October until Christmas.

5. Demonstrations upon the Autopsies of the week to students of the two Final years. These are given during the Session by Drs. Adami and Nicholls at the Royal Victoria Hospital, and Drs. MacTaggart, Anderson and McCrae at the Montreal General Hospital.

Practical Courses.

6. The performance of Autopsies. Each student is required to take an active part in at least six autopsies. These are conducted at the General and the Royal Victoria Hospitals. In addition to the actual performance of the *sectio cadaveris,* the students are expected to attend practical instruction given with each autopsy in the method of preparation and microscopical examination of removed tissues, so as to become proficient in the methods of preparation, staining and mounting.

7. A practical course in the Bacteriology of Infectious Diseases, for students of the Third Year. This course is held twice weekly during the autumn term. A deposit is required in connection with each practical course to cover cost of breakage and loss, subject to refund of balance at the close of the session.

8. A practical course in Morbid Histology to students of the Third Year. This is held twice weekly during the winter term. Students are instructed in the staining and mounting of specimens, and as a rule six sections are distributed at each

meeting of the class so that each student obtains a large representative series of morbid tissues, altogether about 120 in number.

9. A course of demonstrations upon Morbid Anatomy, museum specimens, once weekly during the autumn and winter terms to students of the Fourth Year.

In addition to the above the staff of the department gives instruction to the more advanced students who desire to take any special work in the laboratories, this more especially during the vacations.

For this purpose a special set of rooms has been set apart for Post-Graduate and Advanced Instruction. Accommodation has been provided for classes of twelve to fifteen. In connection with these laboratories for advanced work there is a departmental reference library, rooms for photography, etc.

Optional courses are conducted by the demonstrators of Pathology and the demonstrator of Neuro-pathology during the Session. Classes in Clinical Pathology and Microscopy are given at the General and Royal Victoria Hospitals under the direction of the professors and lecturers in Clinical Medicine.

In connection with this Department, two Research and Teaching Fellowships have been established, one by the Faculty of Medicine and one by the Governors.

Hygiene.

STRATHCONA PROFESSOR:—T. A. STARKEY.

Owing to the endowment of the Department of Hygiene by the Right Honorable Lord Strathcona, a teaching Laboratory has been established in connection with the Chair of Hygiene.

The compulsory course in Hygiene consists of three lessons per week during the winter and spring terms. The course includes the hygiene of air, soil, water and climate; health resorts, personal hygiene, bathing, exercise, clothing, hygiene of special life periods; food and diet;food supply; food diseases and adulterations; hygiene of dwellings; heating, lighting and ventilation; sanitary fittings; municipal sanitation; water supply; sewage; drainage; refuse disposal; burial of the dead; hygiene of occupation; offensive trades; hygiene of hospitals, prisons, etc.; preventive medicine; methods of dealing with infectious diseases and epidemics; communicable diseases of animals; organization of health boards; sanitary law and admin-

istration in relation to the medical practitioner; vital statistics in relation to the healthfulness of communities.

The museum, model room, and laboratory are equipped with working models and apparatus illustrative of application of hygienic principles.

An optional practical course will be open to students wishing to undertake more advanced work.

Special courses of instruction are given to graduates wishing to qualify themselves in sanitary work, or to obtain the diploma in Public Health. "See Post-Graduate Practical Courses."

The Laboratory has been equipped with the apparatus needed in giving practical illustration in Hygiene either as demonstrations to large classes of students, or as practical work for smaller groups.

The arrangement is as follows:—

The Hygiene Department occupies the entire north end of the building on the mezzanine floor, having the floor space corresponding with that of the Department of Histology. The main laboratory is 60 x 50 feet, and it is well equipped with apparatus for demonstrations and practical work in Hygiene. Adjoining it is a balance room and private laboratory, 13 x 15 feet. Opening off the main laboratory is the model room, about 45 x 30 feet, part of which can also be used as additional laboratory space for the carrying out of special experiments and researches, which it would be inconvenient to carry on in the main laboratory. The corridor, 40 x 15 feet, leading to the main laboratory, has been fitted up with cases for the smaller museum specimens and models, lantern slides, etc.

Laryngology and Rhinology.

PROFESSOR:—H. S. BIRKETT.
DEMONSTRATOR:—H. D. HAMILTON.

This course will consist of practical lessons in the use of the Laryngoscope and Rhinoscope. The instruction will be carried on with small classes, so that individual attention may be insured. A limited number of clinical lectures bearing upon interesting cases atending the clinic will be delivered during the session. These lectures will be, however, of an eminently practical nature.

Mental Diseases.

PROFESSOR:—T. J. W. BURGESS.

This course will comprise a series of lectures at the University on Insanity in its various forms, from a medical as well as from a medico-legal standpoint. The various types of mental diseases will be illustrated by cases in the Verdun Hospital, where clinical instruction will be given to visiting groups of Senior students at intervals throughout the session.

Diseases of Infants and Children.

PROFESSORS:— A. D. BLACKADER. J. C. CAMERON.

Although this subject does not constitute a special chair in the University, systematic instruction is given (*a*) in connection with the chair of Obstetrics and Diseases of Infants, by Prof. Cameron; (*b*) by a course of lectures, clinical and didactic, by Prof. Blackader; and (*c*) through the Children's Clinic at the Montreal General Hospital, at the Infants' Home, and at the Montreal Foundling and Baby Hospital.

Clinical Microscopy.

This course, which is given during the Spring Term of the Third Year, is essentially a practical one and is in charge of Professor C. F. Martin, assisted by Drs. W. F. Hamilton, G. G. Campbell, Ridley MacKenzie, C. F. Wylde and F. B. Jones. It is a laboratory course forming part of the Third Year instruction in medicine and is held in the Pathological Laboratory of the Medical Building. The classes are held twice weekly, each demonstration lasting two hours.

Students are given instruction in the microscopic appearances of normal and abnormal sediments in the urine, methods of examination of the blood in the fresh and dried state of preparation; minute appearances of the sputum, stomach contents and fæces, as well as of the various animal parasites of the alimentary tract.

In addition to this the student is given an opportunity of examining the various bacteria of importance in clinical medicine and surgery.

Various specimens of special interest which are found in the hospitals from time to time, are examined as occasion arises at the demonstrations.

V.

DOUBLE COURSES.

B.A. and M.D.

By special arrangement with the Faculty of Arts , it is now possible for students to obtain the double degree of B.A., and M.D., C.M., and also B.Sc. and M.D., after only six years of study.

Course Leading to B.A. and M D.

It has been decided to allow the Primary subjects (Anatomy, Physiology and Chemistry) in medicine to count as subjects of the Third and Fourth Years in Arts. . It follows then that at the end of four years' study a student may obtain his B.A. degree and have two years of his medical course completed.

The remaining two years of study are devoted to the Third and Fourth Year subjects in Medicine.

The special provisions for Medical Students in the Arts course are as follows:—

During the first two years in the Faculty of Arts students taking the double course will complete their studies in Biology, Physics and Elementary Chemistry.

I.—*In the Third Year*:—

(*a*) Anatomy and Practical Anatomy, Histology and Physiology, of First Year Medicine.

(*b*) Two of the courses which are not placed under the heading "Science" in the Arts curriculum. The time tables of the two Faculties allow the following to be chosen:—

(1) French or Moral Philosophy or Economics.

(2) Political Science.

(*c*) Either one or two hours weekly in English Composition.*

II.—*In the Fourth Year*:—

(*a*) Anatomy and Practical Anatomy, Histology, Physiology, Chemistry, of Second Year Medicine.

(*b*) One hour weekly in English Composition, if only one has been taken in the Third Year.

* NOTE.—Students are recommended to distribute their English composition over two years.

B. Sc. (Arts) and M.D.

The Faculties of Arts and Medicine have organized a course of six years' study leading to the double degrees of Bachelor of Science (Arts) and Doctor of Medicine.

The requirements of this course are as follows:—

Matriculation.—The student who proceeds to the Double Course must pass a matriculation examination consisting of English, History, Mathematics (Part (1), French, German, and Latin.

First Year.—During the First Year the course will include English, French, German, Mathematics and Physics, of the first year of the B.A. Course.

Second Year.—During this year English of the second year B.A. Course, French, German, Chemistry and Elementary Biology. The course in Chemistry consists of three lectures per week and two laboratory periods of three hours. The Biology will consist up to Christmas of the Zoology of the Second Year in the Faculty of Arts, which is the same as that required of First Year students in Medicine with the morphology of the frog in addition. After Christmas (spring term Arts), the student may proceed either to a continued course in Animal Biology comprising the osteology of the rabbit and the histology of its tissues, or he may proceed with the Botany of the Second Year in the Faculty of Arts. This course in Botany is introductory to the more specialized work of the Third Year, and will be represented by a number of types, including the flowering plants and the determination of species. Two lectures and two laboratory periods each week during spring term.

In the event of a student selecting Animal Biology after Christmas, he must have taken before Christmas the course in Biology as laid down for medical students, *i.e.*, both Zoology and Botany. If the student select Botany after Christmas, he must have taken Zoology of the second year in the B.Sc. Course, *i.e.*, the anatomy of the frog, in addition to that required of medical students.

Third Year.—The student will enter in the Third Year of his course upon the study of medical subjects proper, having a good theoretical and practical knowledge of Inorganic Chemistry, and will have had a more thorough training in Biology than at present can be given the regular students in

medicine. The time, therefore, during this year, which in the regular medical curriculum is devoted to Chemistry, Practical Chemistry and Biology, will be available for Science subjects of the B.Sc. Course; and a student will have the option of four different branches of science, which shall in each case consist of a full regular course, together with one-half an honor course, the honor course to be given between September and Christmas.

(I) Zoology.—Two lectures during the week, and two laboratory periods of about two hours. This course takes up the study of parasitic forms, of comparative osteology and embryology. In addition to this is a half Honor Course, which will consist of a critical study of some such work as Verworn's General Physiology, or Spencer's General Biology.

(II) Physics.—Two lectures and one period of three hours laboratory work per week. The student may proceed either with Heat and Light, as in the third year Physics Course in Arts, or with Electricity and Magnetism constituting the fourth year Physics in Arts; or he may take a portion of each of these courses, and in addition would do advanced work constituting a half honor course from September to Christmas.

(III) Chemistry.—Two lectures per week and two laboratory periods—the time before Christmas to be devoted to Physical Chemistry, and during the second term to Organic Chemistry, including organic preparations, with advanced work constituting a Half Honor course from September to Christmas.

(IV) Botany.—This course is designed to give a comprehensive knowledge of plant structure and relationships. The principles of devlopment will be illustrated by type studies, which may also serve as the basis for more special work in Bacteriology, Physiology, Ecology or Paleobotany. It comprises:—(*a*) Microscopy, including determination of amplifications, micrometry, drawings, section cutting and preparation of microscopic objects. This work presupposes familiarity with the optics of the microscope as given in Physics "3" of the second year Arts; (*b*) critical studies of the Thallophyta and Pteridophyta, as illustrated by selected types. Two lectures and two laboratory periods each week throughout the session.

Students will also be required to take one-half of the honor work of the Fourth Year Arts in experimental plant Physiology, as based upon the following works:—

Pfeffer, Plant Physiology; MacDougall, Experimental Plant Physiology; Darwin and Acton, Practical Physiology of Plants. One lecture and four laboratory hours per week during autumn term.

It will be permitted also if a student so desires it, to substitute a half honour course in Chemistry, Physics, or Geology, for the half honour course in Botany.

In the fourth year of this six years' course, Wednesday afternoon and Saturday morning of each week will be available for laboratory work in connection with still more specialized study in the subject which has been selected during the third year; or a student may proceed with a branch of science other than the one selected for his third year work, provided he is sufficiently well grounded to enable him to do the special work which may be assigned to him.

Thus the first two years of the six years' course are devoted entirely to the Faculty of Arts, the student taking the option of Biology instead of Mathematics for the second year.

In the Third and Fourth Years work will be given partially in the Faculty of Arts and partially in the Faculty of Medicine. In the Third Year the studies in the two Faculties will be nearly equal; in the Fourth Year they will be almost entirely in the Medical Faculty.

The Fifth and Sixth Years will be occupied by the regular curriculum of the Third and Fourth Years in Medicine.

To secure privileges connected with either of the double courses described above, certificates of registration in the Medical Faculty must be presented at the beginning of each year to the Dean of the Faculty of Arts; and at the end of each session in the first two years certificates of attendance on lectures and of passing the corresponding examinations must also be presented. At the end of the Third and Fourth Years certificates must be presented to show that the full curriculum of the Medical Faculty for the year has been completed.

A certificate of Licentiate in Arts will be given along with the professional degree in Medicine to those who, previous to entrance upon their professional studies proper, have completed

two years in the Faculty of Arts, and have duly passed the prescribed examinations therein.

The Faculty of Medicine strongly recommends students to take an Arts course before beginning Medicine whenever possible, devoting special attention to Chemistry, Biology, Physics, and German. Should a student have but one year at his disposal he is advised to take Chemistry, Biology and Physics of the Faculty of Arts as a preliminary training for Medicine.

VI.

GRADUATE AND ADVANCED COURSES.

The Faculty of Medicine in 1896 established post-graduate and special courses in connection with the Montreal General and Royal Victoria Hospitals and the various laboratories in the University buildings. These courses will be continued in 1903-1904.

There will be two distinct sets of courses, one a short practical and clinical course for medical men in general practice who desire to keep in touch with recent advances in Medicine, Surgery and Pathology, and who wish special clinical experience in Gynæcology, Ophthalmology, Laryngology, etc. This course will last four weeks, beginning on the first of June.

A special detailed programme will be prepared, and will be sent on application in February next. The fee, including hospital fees for both hospitals, is forty dollars.

The other courses will be for those who have just completed their regular course in Medicine, and desire special Laboratory or Clinical teaching before beginning practice.

Arrangements have also been made to accommodate a limited number of such graduates who desire advanced and research work.

Commodious laboratories for advanced work have been equipped in connection with the Pathological and Clinical departments of both the Royal Victoria and Montreal General Hospitals, and in connection with the general laboratories for Pathology, Pharmacology, Physiology and Chemistry, recently altered and extended, in the new buildings of the Faculty.

Recent graduates of recognized universities desiring to qualify for examinations by advanced laboratory courses, or who wish to engage in special research, may enter at any time by

giving notice, stating the courses desired and the time at their disposal.

All the regular clinics and demonstrations of both hospitals will be open to such students on the same conditions as undergraduates in medicine of this University.

These laboratories have been open for graduates since May 1st, 1896.

Further details regarding courses, fees, etc., may be obtained on application to the Registrar.

The Graduate Course of 1903.

The eighth regular course of instruction for General Practitioners will be conducted as before by the Faculty of Medicine of McGill University.

The course for 1903 begins **Monday, June 1st**, and will be continued for four weeks, closing **June 27th.** Time-Tables are issued each week, giving the place and hour for clinics, demonstrations and laboratory work.

The course is essentially a practical one, and every facility will be afforded for the study of the abundant clinical material in the outdoor and indoor departments of the Montreal General and Royal Victoria Hospitals. There are no undergraduate students attending the practice of the Hospitals during the month of June, so that members of the post graduate class will have the whole of this clinical field to themselves.

The two hospitals have accommodation for four hundred indoor patients, and the aggregate number of consultations in the outdoor departments is approximately five thousand per month.

While a full course of clinical and laboratory instruction has been arranged, members of the post graduate class should not feel it incumbent upon them to attend all of these courses unless they so desire; the somewhat full programme having been designed to afford room for selection. The experience of the Faculty in the past has been that some members of the post graduate class wish to give the whole of their time to Medicine, others to Surgery, while a few are particularly interested in the Specialties and in Clinical and General Laboratory work. It is with the view of meeting these various

demands that the Faculty this year has decided to make the subjects on the programme largely optional.

(a.)—Laboratory Instruction.—Systematic Laboratory instruction is given from 9 to 10.30 every morning, on Microscopical Methods, Clinical Microscopy, Clinical Chemistry and Urinalysis, Analysis of Stomach Contents and Clinical Bacteriology; including the diagnosis of Diphtheria, Tuberculosis, etc., the Histology of the blood in disease, and Serum Diagnosis. These courses are conducted under the direction of Professors Ruttan and Adami. A course of Operative Surgery on the cadaver is given from 8 to 9 a.m. by Dr. Kenneth Cameron, during the second and third weeks of the course.

(b.)—Special Demonstrations.—These demonstrations are given daily from 10.30 to mid-day, and will consist of one or more of the following:—Operative Gynæcology, Prof. Gardner; Operative Midwifery, Professor Cameron; Sanitary Topics, Professor Starkey; Clinical use of the Roentgen Rays, Professor Girdwood; Demonstrations on post mortem specimens, Professor Adami and Dr. McCrae; Treatment of Deformities, Dr. Tait McKenzie; and Medical Examination for Life Insurance, Prof. Wilkins.

(c.)—Medical and Surgical Clinics.—For four days each week during the first two hours of the afternoon, there are theatre clinics or classes on groups of cases in the wards of the Montreal General and Royal Victoria Hospitals. Those in Medicine at the Montreal General Hospital are given by Professors Blackader and Lafleur; in Surgery, by Prof. Armstrong and Dr. Hutchison: at the Royal Victoria Hospital in Medicine, by Prof. Stewart and Dr. Hamilton; in Surgery, by Prof. Bell and Drs. Archibald and Keenan.

(d.)—Clinics in Special Departments of Medicine and Surgery.—One or more of these clinics are given in the Hospitals each afternoon after the regular medical or surgical clinic. In Opthalmology, including demonstrations in the use of the Opthalmoscope, Prof. Buller and Drs. Gardner, Stirling and Byers; Dermatology, Dr. G. G. Campbell; Genito-Urinary Surgery, Prof. Bell and Dr. Springle; Orthopedics, Dr. Gilday; Larnygology, Prof. Birkett and Dr. H. D. Hamilton; Gynæcology, Prof. Gardner and Drs. Lockhart and Chipman;

Obstetrics, Prof. J. C. Cameron and Dr. Evans; Diseases of Children, Prof. Blackader and Dr. G. G. Campbell.

The fee for the course including Hospital fees is $40.00.

Diploma Course in Public Health.

The Faculty of Medicine in the session 1899-1900 instituted a gradate course in Public Health and Sanitary Science. This course will be given each year and the diplomas conferred at the annual convocation.

Candidates undertaking this course must have possessed a degree in Medicine or other qualification of practice for at least twelve months before he is competent to receive the diploma. The following are the courses requisite:—

1. Course of lectures in Public Health (to be omitted in the case of candidates who have attended such a course before graduation).

2. A three months' course in Bacteriology, special attention being directed to the pathogenic organisms and parasites—such course to be omitted on presentation of proof that it has previously been taken.

3. A six months' course of practical study of outdoor sanitary work under a medical officer of health (to be omitted in the case of medical health officers holding appointments prior to the establishment of this diploma course).

4. Three months' attendance and clinical instruction at a hospital for infectious diseases (unless such course has already been taken prior to graduation).

5. Three months' instruction in sanitary Chemistry and Physics, with practical work in a chemical laboratory.

Examination for Diploma shall cover the following subjects:—

1. Examination of clinical cases at an infectious hospital.

2. The drawing up of outlines for annual and other reports of officers of health.

3. Report upon the sanitary condition of some actual locality.

4. The chemical analysis of liquids and gases and of specimens of food.

5. Demonstration of the consideration and use of meteorological hygienic and sanitary apparatus.

6. Microscopical examination of specimens submitted.

7. Description of specimens of human and other diseased tissues.

8. Practical examination in the employment of the usual bacteriological methods.

9. The inspection of carcasses of animals to be used for food.

The above examination shall be written and oral and practical, and shall extend over a period of four days.

The following is a list of subjects included in the curriculum of study:—

(*a*) *Sanitary Chemistry*:—Examination of air, gases, water, the action of water on metals; milk, food and beverages; detection of poisons in articles of dress and of decoration; the chemistry of sewage.

(*b*) *Sanitary Physics*:—Principles of statics, pneumatics, hydraulics, light, light and photometry, heat and thermometry, the principles of hygrometry, (only in their application to hygiene).

(*c*) *Sanitary Legislation*:—Statutes and by-laws relating to public health; the powers of public sanitary authorities.

(*d*) *Bacteriology and Parasitology*:—Modes of propagation of disease and transmission of disease between man and man, and man and animals; bacteriological analysis in relation to public health matters; natural history of microbes and animal parasites.

(*e*) *Vital Statistics*:—Calculation and tabulation of returns of births, marriages, deaths and diseases.

(*f*) *Meteorology and Climatology*:—Including the geographical and topographical distribution of disease.

(*g*) *Preventive Medicine and Practical Sanitation.*

The fee for the Diploma shall be $20.

VII.

Qualification for the Degree.*

1st. No one entering after September, 1894, will be admitted to the Degree of Doctor of Medicine and Master of Surgery who shall not have attended Lectures for a period of four nine months' sessions in this University, or some other University, College or School of Medicine, approved of by this University.

* *It shall be understood that the programme and regulations regarding courses of study and examinations contained in this calendar hold good for this calendar year only, and that the Faculty of Medicine, while fully sensible of its obligations towards the students, does not hold itself bound to adhere absolutely, for the whole four years of a students' course, to the conditions here laid down.*

2nd. Students of other Universities so approved and admitted on production of certificate to a like standing in this University shall be required to pass all Examinations in Primary and Final Subjects in the same manner as students of this University.

3rd. Graduates in Arts who have taken two full courses in General Chemistry, including Laboratory work, two courses in Biology, including the subjects of Botany, Embryology, Elementary Physiology and dissection of one or more types of Vetebrata, may, at the discretion of the Faculty, be admitted as second-year students, such courses being accepted as equivalent to the first year in Medicine. Students so entering will, however, not be allowed to present themselves for examination in Anatomy until they produce certificates of dissection for two sessions.

4th. Candidates for Final Examination shall furnish Testimonials of attendance on the following branches of Medical Education. ‡ † viz.:

Anatomy. **Practical Anatomy.** **Physiology.** **Chemistry.** **Pharmacology and Therapeutics.** **Principles and Practice of Surgery.** **Obstetrics and Diseases of Infants.** **Gynæcology.** **Theory and Practice of Medicine.** **Clinical Medicine.** **Clinical Surgery.**	**Of which Two full Courses will be required.**
Medical Jurisprudence. **General Pathology.** **Hygiene and Public Health.** **Practical Chemistry.** **Ophthalmology and Otology.**	**Of which One full Course will be required.**
Biology. **Histology.** **Pathological Anatomy.** **Bacteriology.** **Mental Diseases.** **Pediatrics.** **Medical and Surgical Anatomy.**	**Of which One Course will be required.†**

‡ Provided, however, that Testimonials equivalent to, though not precisely the same as those above stated, may be presented and accepted.

† Students enregistered in the Province of Quebec are required to attend and pass examinations in Laryngology and Minor Surgery.

He must also produce Certificates of having assisted at six Autopsies, of having dispensed Medicine for a period of three months, and of having assisted at twenty Vaccinations.

5th. Courses of less length than the above will only be received for the time over which they have extended.

6th. No one will be permitted to become a candidate for the degree who shall not have attended at least one full Session at this University.

7th. The candidates must give proof of having attended during at least twenty-four months the practice of the Montreal General Hospital or the Royal Victoria Hospital or of some other hospital of not fewer than 100 beds, approved by this University. Undergraduates are required to attend only the practice of the Out-Patient departments of the Hospitals during their second year.

8th. He must give proof of having acted as Clinical Clerk for six months in Medicine and six months in Surgery in the wards of a general hospital recognized by the Faculty, of having reported at least 10 medical and 10 surgical cases.

9th. He must also give proof by ticket of having attended for at least nine months the practice of the Montreal Maternity or other lying-in-hospital approved of by the University, and of having acted as assistant at least six cases.

10th. Every candidate for the degree must, on or before the 15th day of May, present to the Registrar of the Medical Faculty testimonials of his qualifications, entitling him to an examination, and must at the same time deliver to the Registrar of the Faculty an affirmation of affidavit that he has attained the age of twenty-one years.

11. The trials to be undergone by the candidate shall be in the subjects mentioned in Section 4.

12. The following oath of affirmation will be exacted from the candidate before receiving his degree:

Sponsio Academica.

In Facultate Medicinæ Universitatis.

Ego, A——— B———, Doctoratus in Arte Medica titulo jam donandus, sancto coram Deo cordium scrutatore, spondeo:—me in omnibus grati animi officiis erga hanc Universitatem ad extremum vitæ halitum perserveraturum; tum poro artem medicam caute, caste, et probe exercitaturum; et quoad in me est, omnia ad ægrotorum corporum salutem corducentia cum fide procuraturum; quæ denique inter medendum, visa vel audita silere conveniat, non sine gravi causa vulgaturum. Ita praesens mihi spondenti adsit Numen.

13th. The fee for the Degree of Doctor of Medicine and Master of Surgery shall be thirty dollars, to be paid by the successful candidate to the University Bursar immediately after examination.

VIII.

Examinations.

Frequent oral examinations are held to test the progress of the student, and occasional written examinations are given throughout the Session.

The **Pass** and **Honor** examinations at the close of each Session are arranged as follows:—

FIRST YEAR.

Examinations in **Biology, Histology, Physiology, Anatomy, Chemistry, Practical Chemistry and Elementary Bacteriology.**

Students who have taken one or more university courses in Biology or Chemistry before entering may be exempted from attendance and examination. Students exempted in these First Year subjects are allowed only a pass standing, but may present themselves for examination if they desire to attain an honour standing. Students exempted from First Year Chemistry must take Second Year Chemistry in their First Year.

SECOND YEAR.

Examinations in **Anatomy, Chemistry, Practical Chemistry, Physiology, Practical Physiology, Pharmacology** and **Histology.**

THIRD YEAR.

Examinations in **Pharmacology** and **Therapeutics, Medical Jurisprudence, Public Health** and **Preventive Medicine** (including **Bacteriology**), **General Pathology, Mental Diseases, Clinical Chemistry, Clinical Microscopy, Obstetrics, Medicine** and **Surgery.**

FOURTH YEAR.

Examinations in **Medicine, Surgery, Obstetrics, Gynæcology, Ophthalmology, Clinical Medicine, Clinical Surgery, Clinical Obstetrics, Clinical Gynæcology, Clinical Ophthalmology** and **Practical Pathology.**

By means of the above arrangement a certain definite amount of work must be accomplished by the student in each

year, and an equitable division is made between the Primary and Final branches.

A minimum of 50 per cent. in each subject is required to pass and 75 per cent. for honors.

Candidates must pass in all the subjects of each year; those who fail to pass in not more than two subjects of either the First, Second or Third Years, may be granted a supplemental examination at the beginning of the following session.

Supplemental examinations will not be granted, except by special permision of the Medical Faculty, and on written application stating reasons, and accompanied by a fee of $5.00 for each subject.

No candidate will be permitted, without special permission of the Faculty, to proceed with the work of the Final Year until he has passed all the subjects comprised in the Primary examination.

No student will be allowed to present himself for his Final examinations who has not certificates of having passed all his Primary examinations in this University.

Candidates who fail to pass in a subject of which practical courses are required may, at the discretion of the Faculty, be required to repeat the course, and furnish a certificate of attendance thereon. A course in Practical Anatomy will be accepted as equivalent to a third course of lectures in General and Descriptive Anatomy.

IX.

Fellowships, Medals and Prizes.

1. Fellowships.—The Faculty has begun to establish Teaching and Research Fellowships in connection with the various laboratories.

These fellowships are of a value of five hundred dollars per annum, are open only to graduates in Medicine, and are tenable for three years.

Two are now established in connection with the department of Pathology—a Governor's Fellowship endowed by one or two of the Governors of the University, and a Faculty Fellowship established by the Faculty. Other Fellowships will be announced as they are established.

2. Medals.—The "**Holmes Gold Medal**," founded by the Medical Faculty in the year 1865, as a memorial of the late

Andrew Holmes, Esq., M. D., L.L.D., late Dean of the Faculty of Medicine. It is awarded to the student of the graduating class who receives the highest aggregate number of marks in the different branches comprised in the Medical Curriculum.

The student who gains the Holmes' Medal has the option of exchanging it for a Bronze Medal, and the money equivalent of the Gold Medal.

"The Sutherland Gold Medal," founded in 1878 by the late Mrs. Sutherland in memory of her late husband, William Sutherland, M.D., formerly Professor of Chemistry in this Faculty. It is awarded for the best examination in General and Medical Chemistry, together with creditable examination in the Primary branches. The examination is held at the end of the Third Year.

3. PRIZES.—**The Final Prize.**—A Prize in books (or a Microscope of equivalent value) awarded for the best examination, written and oral, in the Final branches. The Holmes' medalist is not permitted to compete for this prize.

The Third Year Prize.—A Prize in books awarded for the best examination, written and oral, in the branches of the Third Year.

The Second Year Prize —A Prize in books for the best examination in all the branches of the Second Year in course.

The First Year Prize.—A Prize in books for the best examination in all the branches of the First Year in course.

The **"Clemesha Prize in Clinical Therapeutics,"** founded in 1889 by John W. Clemesha, M.D., of Port Hope, Ont. It is awarded to the student making the highest marks in a special clinical examination.

X

Fees.

See page 31.

XI.

Text Books.

ANATOMY.—Gray, Morris, Quain (Eng. Ed.) Gervish and Cunningham.
PRACTICAL ANATOMY.—Cunningham's Practical Anatomy, Ellis Demonstrations, Holden's Dissector and Landmarks
PHYSICS.—Carhart and Chute; Medical Physics, Daniel; Ref. Medical Electricity, Turner.

INORGANIC CHEMISTRY.—Holleman, Richter 5th ed., Remsen.
ORGANIC CHEMISTRY.—Remsen.
PHARMACOLOGY AND THERAPEUTICS.—Butler, Hare and Wood, Sollmann, Cushing.
PHYSIOLOGY.—Foster and Shore's Physiology for Beginners, Mills' Text-Book of Animal Physiology, Foster's Physiology, G. N. Stewart's Physiology, Mills' Class Laboratory Exercises.
PATHOLOGY.—Zeigler, Coats', American Text-book of Pathology, Stengel.
PRACTICAL PATHOLOGY.—Mallory and Wright, Delafield & Prudden, Boyce.
BACTERIOLOGY—Muir & Ritchie, Abbott.
HISTOLOGY.—Klein's Elements, Schafer's Essentials of Histology, Stohr, Szymonowicz.
SURGERY.—Holmes, Moullin, Walsham, Erichsen, Treves, American Text-Book of Surgery, Da Costa.
PRACTICE OF MEDICINE.—Osler, Tyson, Wood and Fitz.
CLINICAL MEDICINE.—Musser's Medical Diagnosis; Simon, Klemperer, Rainy and Hutchison, Vierort's Medical Diagnosis.
MEDICAL JURISPRUDENCE.—Reese, Guy and Ferrier, Mann.
MENTAL DISEASES.—Insanity and its Treatment, Blandford, 4th Ed.
NERVOUS AND MENTAL DISEASES.—Church and Paterson, 2nd ed.
OBSTETRICS.—Jewett, Hirst, American Text-Book and Evans' Pocket Text-Book.
DISEASES OF CHILDREN.—Holt, Rotch, Smith and Starr.
GYNÆCOLOGY—Hart and Barbour, Garrigues, Webster, Dudley on Diseases of Women.
HYGIENE.—Davies, Wilson, Rohe, Whitelegge, Harrington, Abbott's Transmissible Diseases.
BIOLOGY, BOTANY.—Gray's Text-Book of Histology and Physiology; ZOOLOGY, Shipley and MacBrides' Introduction to Zoology.*
OPTHALMOLOGY.—De Schweinitz, Nettleship and Swanzy.
OTOLOGY.—Pritchard, Dalby.
LARYNGOLOGY.—Watson Williams, Grumwald's Atlas of Diseases of Larynx, Gradle.
OPERATIVE SURGERY.—Jacobson, Treves, Kocher.
DERMATOLOGY.—Malcolm Morris, Hyde, Crocker, Stellwagon.
MEDICAL DICTIONARY.—Gould, Dunglison, Hoblyn.

XII.

Museums.

The Faculty has during recent years devoted special attention to the development of its museums in the several departments in which objective teaching is of especial value in the education of the student.

There are now four museums in the Medical Building: (1) the Museum of Pathology, (2) the Anatomical Museum, (3) the Museum of Public Health and Preventive Medicine, (4) the Museum of Pharmacy.

* Each student will be required to pay $2.50 in order to cover the cost of a class book, dissecting instruments and other neeessaries which are supplied to him and become his property.

Each collection is arranged and selected with the primary object of making it a teaching museum. The several collections are open to students and the public between 9 a.m. and 5 p.m.

Pathological Museum.

PROF. J. G. ADAMI, DIRECTOR.

MAUDE E. ABBOTT, B.A., M.D., ASSISTANT CURATOR.

M. JULES BAILLY, OSTEOLOGIST AND ARTICULATOR.

For the past fifty years the rich Pathological Material furnished by the Montreal General Hospital has been collected here. The Faculty is also greatly indebted to many medical men throughout Canada and different parts of the world for important contributions to the Museum.

During the past few years, numerous and extremely important additions have been made to the Medical Museum.

It is particularly rich in specimens of Aneurisms. In addition to containing a large number of the more common varieties of these formations, there are specimens of such rare conditions as Aneurism of the hepatic and superior mesenteric arteries, traumatic aneurism of the vertebral together with several of the cerebral and pulmonary arteries. The most important collection probably in existence of hearts affected with "Malignant Endocarditis" is also found. The Faculty are indebted to Prof. Osler, late of this University, for this collection.

The Museum contains also a very large collection of different forms of calculi. The Faculty are mainly indebted to Prof. Fenwick for this collection.

During the past ten years, M. Bailly, osteologist and articulator (lately with Tramond of Paris), has been engaged in arranging and mounting the very large number of specimens of disease and injuries of bones which have been accumulating for years. In this collection are to be found examples of fractures and dislocations of the spine, osteoporosis, congenital dislocation of the hip, fracture of the astragalus, multiple exostoses, etc., etc.

The Pathological Museum has recently undergone complete alteration. All the old fixtures have been removed, a new gallery has been erected about both rooms, reached by a single staircase in a small intermediate room in which is placed the medico-legal collection.

The first room on entering contains the extensive bone collection and calculi. The second and larger room is reserved for the moist preparations, which are arranged so as to be of easy access for the student. Water color drawings made from the fresh specimens are mounted on swinging frames, and also form a frieze at the ceiling. These serve to recall the fugitive colors of those preparations which become more or less altered on keeping.

Numerous specimens have been contributed from the surgical and medical wings of the Royal Victoria Hospital, and from the different departments of the Montreal General Hospital.

Museum of Hygiene.

DIRECTOR, PROF. T. A. STARKEY.

This Museum has been established from the interest accruing through the endowment of the Chair of Hygiene by Lord Strathcona and Mount Royal in 1893.

In order to facilitate study and reference, the specimens in the Museum have been all classified upon a decimal system under the following sections:—

1. *External Hygienic Conditions.*—Air, Soil, Meteorology, Climate.

2. *Personal Hygienic.*—Food and Diet, Bathing, Clothing, Special Life Periods.

3. *Analytical Hygiene.*—Apparatus, etc., for Sanitary Analysis.

4. *Architectural Hygiene.*—House Sites, Plans, Materials, Construction, Ventilation, Heating and Lighting, Sanitary Fittings.

5. *Municipal Hygiene and Sanitary Engineering.*—Water Supply, Sewage, Drainage, Refuse, Disposal, Street Hygiene, Disposal of the Dead.

6. *Collective Hygiene.*—Hygiene of Occupation, Offensive Trades, Accident Prevention, Hygiene of Schools, Prisons, Asylums, etc.

7. *Infectious Diseases.*—Pathogenic Bacteria and Fungi, Animal Parasites, Public Diagnosis and Care of Infectious Diseases, Quarantine, Disinfection, the Communicable Diseases of Animals.

7. *Sanitary Administration.*

9. *Vital Statistics.*

In addition to the regular Museum Exhibit, there is a collection of over 1,000 lantern slides illustrative of phases of Hygiene. The slides have been so arranged as to be available for demonstrations as hand specimens. These slides as well as all the specimens in the Museum are card catalogued, and a projecting lantern is available for their demonstration.

The following are some of the principal exhibits:—Set of Knight's diagrams and models; working models illustrating house drainage, closets, etc., sewer air, movements of soil air; Doulton's models, of drainage, damp proof construction, absorption of moisture in building materials, ventilation appliance, combined heating and ventilation, automatic regulation of heating and ventilation; building materials; fire proofing; estimation of carbonic acid and moisture in the air; meteorological observation; water supply, water piping; water filtrations of public and domestic supplies; pollution of water supplies; ground water level; sewage and refuse disposal; food supply; food adulteration; examination of milk supplies; disinfection, disinfectants.

The following donations have been received during the year:—

Johnson Electric Service Company of Buffalo—Model of Automatic Heat Regulator.

Ogilvie Brothers, Montreal—Apparatus for testing efficiency of closets, traps, etc.

Frank-Jenner Fire-Proofing Company, New York—Specimens of Lignolith.

J. W. Hughes, Montreal—Sample of defective plumbing.

Canadian Asbestos Company—Sample of covering for steam pipes.

Anatomical Museum.

DIRECTOR, PROFESSOR F. J. SHEPHERD.
M. JULES BAILLY, OSTEOLOGIST AND ARTICULATOR.

This Museum occupies a large room on the same floor and adjoining the Anatomy Lecture Room and Dissecting Room. Smaller apartments in connection are used for private research, which is encouraged in every way by the Faculty.

The Museum is well furnished and comfortable, and students have every opportunity of studying Human, Comparative and Applied Anatomy.

This department has during the past few years added a very complete collection of plaster and papier maché models by Steger, after the well-known works of His and Braune, comprising:

(*a*) A complete set of Steger's brain sections.

(*b*) Models of the cerebro-spinal and sympathetic nervous systems.

(*c*) Professor Cunningham's well-known and beautiful casts of the head showing the relation of the cerebral convolutions to the skull and its sutures.

A large collection of human brains, made by Professor Osler, formerly of this University, exhibiting the various types and extremes.

A large and rare collection of anomalies of the renal vessels and ureter, and the aorta and its branches.

In Comparative Anatomy the student will find a fair amount of material, the study of which will greatly aid him in the elucidation of many points in Human Anatomy.

Some beautiful dissections of the semicircular canals of the ears of fishes and also specimens showing the nervous system of fishes. Made and presented to the Museum by Dr. Cresswell Shearer.

Many skeletons mounted by Mons. Jules Bailly, Articulator to the University, representing the various classes, orders, genera and species of the animal kingdom may be consulted.

A large collection, showing the pectoral girdle in birds, has been prepared under the supervision of the Professor of Anatomy.

Moist and dry preparations of dissections, a large collection of frozen cross sections of the human body, showing the normal relations of the viscera, etc., will be found convenient for study.

XIII.

Library.

LIBRARIAN:—PROF. F. G. FINLEY.
ASSISTANT LIBRARIAN:—MISS M. R. CHARLTON.

The Library of the Medical Faculty now comprises upwards of twenty-three thousand volumes, the largest special library connected with a medical school on this continent.

The valuable libraries of the late Professors Robert Palmer Howard, George Ross, Richard L. MacDonnell, T. Johnston Alloway and of Dr. Allen Ruttan have been donated to the Medical Faculty.

The standard text-books and works of reference, together with complete files of the leading periodicals, are on the shelves. Students may consult any work of reference in the library between 9 a.m. and 6 p.m., and from 7 to 10 p.m. A large library reading-room for the use of students is provided.

Extracts from the Library Regulations.

I. During the College Session the Library is open daily (except Sundays and general public holidays) from 9 a.m. till 6 p.m., and from 7 to 10 every evening. During vacation from 9 a .m. to 5 p.m.

II. The stack room is not open to students or to the public.

III. The books in the Library are classed in two divisions: 1st, those which may be taken from the Library; 2nd, those which may not, under any circumstances, be removed from the Library. The latter class includes all catalogues, dictionaries and encyclopedias.

IV. Students will be allowed to use regular text-books only in the Library. Any other book may be taken out at 5.30 p.m. to be returned the next day. If books so removed from the Library are not returned punctually, a fine will be imposed, and if the delay be serious the student may be suspended from use of the Library at the discretion of the Librarian.

V. Students may take out books, subject to the above regulations, to the number of three volumes at one time.

VI. Books may be taken from the Library only after they have been especially asked for and charged at the delivery desk; borrowers who cannot attend personally must sign and date an order, giving the titles of the books desired and the name of the person deputed to procure the same.

VII. Damage to or loss of books shall be made good to the satisfaction of the Librarian and of the Library Committee. Writing or making any mark upon any book belonging to the Library is unconditionally forbidden. Any persons found guilty of wilfully damaging any book in any way shall be excluded from the Library, and shall be debarred from the use thereof for such time as the Library Committee may determine.

VIII. Silence must be strictly observed in the Library.

IX. Infringement of any of the rules of the Library will subject the offender to a fine or suspension of his privileges, or to such other penalty as the nature of the case may require.

The number of volumes presented to the Library from Nov. 1st, 1901, to Oct. 31st, 1902	1,823
Those added by purchase	150
Total additions to November, 1902	1,973
The attendance of readers	9,956
June 15th, 1901, has been	10,070
The attendance from June 2nd, 1897, to May 14th, 1898, was	6,350
The attendancec from June 1st, 1896, to June 1st, 1897, was	5,920
The attendance from June 1st, 1895, to June 1st, 1896, was	4,875
The number of books taken out for home use, Nov. 1st, 1901, to Oct. 31st, 1902	3,710
The number of journals and pamphlets has been	351

This does not include the works consulted in the Library.

The Faculty has endeavored to make the Library as complete as possible for research work. Complete files of almost all the important periodicals are now on the shelves, including foreign as well as English and American journals. A large number of transactions of various societies have recently been acquired, and also the Berlin and Paris theses.

Arrangements have been made whereby practitioners both in the city and country can avail themselves of the library, the only conditions being the payment of express charges and a guarantee for the safe return of books borrowed.

XIV.

McGill Medical Society.

This Society, composed of enregistered students of the Faculty, meets every alternate Saturday during the Autumn and Winter Terms, for the reading of papers, case reports and discussions on medical subjects. A prize competition has been established in Senior and Junior subjects, the Senior being open

to all to write upon, while only the 1st, 2nd and 3rd year students are allowed to compete in the Junior subjects. The papers are examined by a board elected from the Professoriate, and a first and second prize in each division of subjects is awarded to the successful candidates.

Names of competitors and titles of papers shall be sent to the Chairman of the Programme Committee before September 1st, and all papers shall be subject to the call of the Committee on October 1st. All papers shall be handed in for examination on or before January 10th.

The students' reading room has been placed under the control of this Society, in which the leading English and American Medical Journals are on file, as well as the leading daily and weekly newspapers of the Dominion.

The annual meeting is held the first week of the Spring Term, when the following officers are elected: Hon. President (elected from the Faculty), President, Vice-President, Secretary, Assistant Secretary, Treasurer, Reporter, Pathologist, and three Councilmen (of whom two shall be elected from the Faculty).

XV.

Hospitals.

The City of Montreal is celebrated for the number and importance of its public charities. Among these its public hospitals are the most prominent and widely known. Those in which medical students of McGill University will receive clinical instruction are: (1) The Montreal General Hospital. (2) The Royal Victoria Hospital. (3) Montreal Maternity Hospital.

The Montreal General Hospital has for many years been the most extensive clinical field in Canada. The old buildings, having proved inadequate to meet the increased demand for hospital accommodation, have been increased by the addition of two surgical pavilions, the Campbell Memorial, and the Greenshields Memorial, and of a new surgical theatre. The interior of the older buildings now has been entirely reconstructed on the most approved modern plans.

The Royal Victoria Hospital at the head of University Street, which in structure and arrangements ranks among the finest

modern hospitals of either continent, was opened for the reception of patients the first of January, 1894, and affords exceptional opportunities for clinical instruction and practical train-

Montreal General Hospital.

This Hospital consists of a Surgical, a Medical and a Pathological Department.

The Surgical Department has two large pavilions, containing four wards 135 feet long by 35 feet broad, with an intervening and connecting building in which is a large operating theatre of the most modern type, capable of seating over 350 students. In connection with this are preparation, etherising, instrument, steriliising and surgeons' rooms, also smaller operating rooms. The surgical pavilions accommodate over one hundred patients.

The old part of the hospital, consisting of the Reed, Richardson and Morland wings, has been completely rebuilt and remodelled, and forms the Medical Department. This part contains four wards, 100 feet by 40, and is arranged for 150 beds. In this building there are wards for gynaecological and opthalmological patients, and a number of private wards and laboratories for Clinical Chemistry. There is also a medical amphitheatre capable of seating 150 students and a gynaecological operating room fitted up in the most modern manner. The central part of the old building is for administration purposes.

A completely new and commodious out-door patient department has been provided on the ground floor of the Richardson wing, and there is ample accommodation for the various special departments as well as large rooms for general medical and surgical patients.

The Pathological Department is a completely new building in which are the post-mortem theatre and rooms for microscopical and bacteriological work, and also a mortuary and chapel. In this building students are offered every opportunity of perfecting their knowledge of morbid anatomy and pathological histology.

The old Fever Wards on the grounds of the Hospital have been completely remodelled, and are now used as a laundry and kitchen.

A much larger number of patients receive treatment in the Montreal General Hospital than in any other Canadian hos-

pital. Last year's report shows that over three thousand Medical and Surgical cases were treated in the wards, and the great proportion of these were acute cases as may be gathered from the fact that the average duration of residence was only 24.02 days. There are upward of forty thousand consultations annually in the out-door department of this Hospital.

The Royal Victoria Hospital.

This Hospital is situated a short distance above the University Grounds on the side of the Mountain, and overlooks the city. It was founded in July, 1887, by the munificence of Lord Mount Stephen and Lord Strathcona, who gave one million dollars for this purpose.

The buildings, which were opened for the reception of patients on the first of January, 1894, were designed by Mr. Saxon Snell of London, England, to accommodate between 250 and 300 patients.

The Hospital is composed of three main buildings connected together by stone bridges; an Administration Block in the centre and a wing on the east side for medical patients, in immediate connection with which is the Pathological wing and mortuary, and a wing on the west side for surgical patients.

The Administration block contains ample accommodation for the resident medical staff, the nursing staff and domestics. The patients' entrance, the dispensary and admission rooms are also situated in this building. To the north of the Administration block has been erected a large out-patients' department, in which are special departments for Minor Surgery, Opthalmology, Laryngology, and Gynaecology. This wing was opened for patients during the winter of 1899-1900.

The Medical wing contains three large wards, each 123 feet long by 26 feet 6 inches wide, one ward 40 feet by 26 feet 6 inches, and 15 private and isolation wards averaging 16 feet by 12 feet; also a medical theatre with a seating capacity for 250, and three rooms adjacent to it for clinical chemistry, and other purposes. North of this wing and in direct connection with it are the Pathological laboratories and mortuary.

In this wing are situated the mortuary proper, the chapel, a post mortem room capable of accommodating 200 students, and laboratories for the microscopic and bacteriological study

of morbid tissues, some designed for the use of students and others for post graduation courses and special research. Special laboratories for Pathological Chemistry, Experimental Pathology, Bacteriology and Photography are also provided.

The Surgical wing contains three large wards, each 123 feet long by 26 feet 6 inches wide, four wards each 40 feet by 32 feet, and seven private and isolation wards, averaging 16 feet by 12 feet; also a surgical theatre with a seating capacity for 250, with six rooms adjacent for preparation of patients.

In this wing are also the wards for Gynaecology and Ophthalmology. There is also an Isolation Pavilion for infectious diseases.

XVI.

CLINICAL INSTRUCTION.

During the Session of 1903-1904, three Medical, three Surgical, two Gynaecological and two Opthalmological clinics will be held weekly in both the Montreal General and Royal Victoria Hospitals.

In addition, tutorial instruction will be given in these different departments in the ward, out-patient rooms and laboratories. Special weekly clinics will be given in the Montreal General Hospital on Dermatology and Laryngology and in the Royal Victoria Hospital on diseases of the Genito-Urinary system, Laryngology and Neurology.

Clinical Clerks in the medical and surgical wards of both Hospitals are appointed every three months, and each one during his term of service conducts, under the immediate directions of the Clinical Professors, the reporting of all cases in the ward allotted to him. Students entering on and after October, 1893, are required to show a certificate of having acted for six months as clinical clerk in medicine and six months in surgery, and are required to have reported at least ten cases in medicine and ten in surgery. The instruction obtained as clinical clerk is found to be of the greatest possible advantage to students, as affording a true *practical* training for his future professional life.

Dressers are also appointed to the Out-door Departments. For these appointments, application is to be made to the Assistant Surgeons, or to the resident surgeon in charge of the out-patient department.

The large number of patients affected with diseases of the eye and ear, now attending the special clinics at both hospitals afford ample opportunity to students to become familiar with all the ordinary affections of those organs, and to make themselves proficient in the use of the ophthalmoscope; and it is hoped that every student will thus seek to gain a practical knowledge of this important branch of Medicine and Surgery. Operations are performed on the eye by the Ophthalmic Surgeons after the outdoor patients have been seen, and students are invited to attend the same, and as far as practicable to keep such cases under observation so long as they remain in the Hospital.

There are also special departments in both Hospitals for Gynaecology and Laryngology, directed by Specialists in these branches. Students are thus enabled to acquire special technical knowledge under skilled direction. The plan of teaching practical gynaecology for the past five years with marked success has been the limitation of the number of students attending each clinic to four.

The Clinics at the Montreal General Hospital in Dermatology and in both hospitals in Laryngology are very large, and afford a practical training in affections of the skin and throat rarely obtained by medical students.

A special clinic for diseases of the Genito-Urinary Organs has been established at the Royal Victoria Hospital.

Infectious diseases and Insanity will also be taught clinically, the former in the special wards for infectious diseases and the latter at the Verdun Hospital for the Insane.

XVII.

The Montreal Maternity.

The Faculty has great pleasure in announcing that the Corporation of the Montreal Maternity has in contemplation the erection of a large new building fitted with the most modern appliances. The new hospital will be situated at the corner of Prince Arthur and St. Urbain streets. Plans and specifications for it are now about complete. Students will therefore have greatly increased facilities for obtaining a practical knowledge of obstetrics and diseases of infancy. An improved Tarnier-Budin phantom is provided for the use of the students, and every facility afforded for acquiring a practical knowledge

of the various obstetric manipulations. The Institution is under the direct supervision of the Professor of Midwifery, who devotes much time and attention to individual instruction. Students who have attended the course in Obstetrics during the winter and spring terms of the Third Year will be furnished with cases in rotation, which they will be required to report and attend till convalescence.

An outdoor service in connection with the Maternity has been established, the resident physician and a nurse being sent out to attend deserving cases in their own homes. Students who have had six cases in the hospital are sent out with the resident physician to such cases whenever it is possible.

Clinical Obstetrics has been placed upon the same basis as Clinical Medicine and Surgery, and a final clinical examination has been instituted. Every student must give in two complete clinical reports of cases observed by himself before presenting himself for the final clinical examination. Marks are given for these reports in the Final examination for degree. Regular courses of clinical lectures are given throughout the session, special attention being paid to the important subject of infant feeding. The Walker-Gordon process of modifying milk is explained and demonstrated. At the regular Saturday clinic the work of the past week is reviewed, and an opportunity is given for the examination of patients and the discussion of points of interest in diagnosis and treatment.

During the autumn and winter terms the Lecturer and Demonstrators of Obstetrics give a palpation course, clinical demonstrations in the wards and instruction in operative work on the phantom. Students will find it very much to their advantage to pay special attention to their clinical work during the spring term of the Third Year and the following summer.

One resident medical officer is appointed yearly to hold office for a period of nine months, and one for a period of three months.

Fee for twelve months, $12; payable at the Maternity Hospital.

Hospital Appointments.

The Resident Medical and Surgical Staff of the Montreal General, the Royal Victoria and the Maternity Hospitals, is selected by examination from the members of the graduating class of each year. There are from fifteen to twenty such ap-

pointments made annually which are tenable for from one to three years, while a number of them carry a small salary with them. The following students of the graduating class of 1902 received hospital appointments:—

ROYAL VICTORIA HOSPITAL:

Surgical Side: Drs. J. D. Dixon and J. L. D. Mason,
Medical Side: Drs. J. R. Byers and J. C. Colby.
Ophthalmology: Dr. N. C. Jones.
Anaesthetist: Dr. L. C. Harris.
Locum Tenens: Drs. H. K. Stockwell and J. A. MacNaughton.

MONTREAL GENERAL HOSPITAL:

Drs. W. A. Gardner, R. C. Paterson, J. W. Manchester, J. A. E. Campbell, W. E. Dixon, W. E. McKee.
Locum Tenens: Drs. J. F. C. Foster, F. C. Mason, S. Evans.

MATERNITY HOSPITAL:

Dr. C. W. Hopkins.
Locum Tenens: Dr. Geo. Moffat.



University Library.

The University Library.

C. H. Gould, B.A., Librarian.

The various libraries of the University now contain about 97,000 volumes, and a large number of pamphlets.

In addition to the general works selected with a view to illustrating the several courses of University study, the Committee has latterly been enabled through generous gifts to acquire many sets of serials and monographs which are indispensable for research, and to provide for the symmetrical growth of the Library.

There are now on the shelves more than 250 complete fyles of periodicals and transactions of various literary and scientific societies, many of which have been added during the past year through the liberality of Sir W. C. MacDonald.

Among the special collections exclusive of departmental libraries, mention should be made of the *Redpath Historical Collection*, formed by the late Mr. Peter Redpath some years before his death. This is still being added to by Mrs. Peter Redpath, is now of great value, and affords unusual opportunities for the study of English History. The most prominent part of the collection—a series of political and religious tracts—has been greatly enlarged by Mrs. Redpath, and now comprises about 9,000 brochures, dating from 1600 to the middle of the last reign.

Abundant materials, bearing upon the History of Canada, have been gathered together. Of these the nucleus is formed by the entire library of the late Mr. Frederick Griffin, whose choice books were, some years ago, bequeathed to the University. This branch of the library is being steadily augmented, and includes interesting Canadian portraits and autographs.

The Medical Library, directly controlled by the Faculty of Medicine, is the largest of the departmental libraries, and is one of the most complete collections of its kind in the Dominion.

About 250 current periodicals, literary and scientific, are subscribed for through the various departments of the University. Besides these, the library regularly receives Serials, Transactions and Proceedings of Societies. The list of both periodicals and serials is being extended yearly.

The generosity of the family of the late Mr. Hugh McLennan has enabled the Library Committee to establish and operate for the past two years a system of travelling libraries. These are sent on application, and the payment of a nominal fee of $3, to any point in Canada. The regulations and full particulars may be obtained from the Librarian of the University.

Although the library is maintained primarily for members of the University, the Corporation has provided for the admission, upon certain conditions, of such persons as may be approved by the Library Committee. It is the desire of the Committee to make the library as ueful to the entire community as is consistent with the safety of the books and the general interests of the University.

Extract from the Library Regulations.

1. During the College Session the Library is open daily (except Sundays and general public holidays), from 9 a.m. till 5 p.m.; and the Reading Room from 9 a.m. till 6 p.m., and also from 7.30 till 10.30 p.m. On Saturdays, both Library and Reading Room close at 5 p.m. During vacations, both Library and Reading Room close at 5 p.m., and on Saturdays at 1 p.m.

2. Students in the Faculty of Arts, of Law, and of Applied Science are entitled to read in the Library, and may borrow books (subject to the regulations) to the number of three volumes at one time.

3. Students in the Faculty of Medicine, who have paid the Library fee to the Bursar, may read in the Library, and on depositing the sum of $5 with the Bursar, may borrow books on the same conditions as students in other Faculties. They are required to present their Matriculation Tickets to the Bursar and to the Librarian.

4. Graduates in any of the Faculties, on making a deposit of $5, are entitled to the use of the Library, subject to the same rules and conditions as students in Arts, Law, or Applied Science.

5. Books may be taken from the Library only after they have been charged at the Delivery Desk; borrowers who cannot attend personally must sign and date an order, giving the titles of the books desired.

6. Books in the Reference Library must not be taken from the Reading Room; and, after they have been used, they must be returned promptly by readers to their proper places upon the shelves.

7. Before leaving the Library, readers must return the books they have obtained to the attendant at the Delivery Desk.

8. All persons using books remain responsible for them so long as the books are charged to them, and borrowers returning books must see that their receipt is properly cancelled.

9. Writing or making any mark upon any book belonging to the Library is unconditionally forbidden. Any person found guilty of wilfully damaging any book in any way shall be excluded from the Library; and shall be debarred from the use thereof for such time as the Library Committee may determine.

10. Damage to or loss of books, maps, or plates, and injury of Library fixtures, must be made good to the satisfaction of the Librarian and of the Library Committee.

Damage, loss or injury when the responsibility cannot be traced will be made good out of the caution money deposited by students with the Bursar.

11. Should any borrower fail to return a book upon the date when its return is due, he may be notified by postal card of his default, and be requested to return the book. If the loan is not renewed, or the book returned, after a further delay of at least three days, it may be sent for by special messenger, at the borrower's expense.

12. Before the close of the session, students in their final year must return uninjured, or replace to the satisfaction of the Librarian, all books which they have borrowed.

13. Silence must be strictly observed in the Libraries.

14. Infringement of any of the rules of the Library will subject the offender to a suspension of his privileges, or to such other penalty as the nature of the case may require.

McGill College Book Club.

ESTABLISHED, A.D. 1869.

This Club is in the 35th year of its existence and has for its two-fold object to procure an early supply of new books (novels excluded) for its members, and the increase of the Library. By this means an addition has already been made to the Library of not less than 4,000 volumes in special and general literature.

Membership in the Club is open to all, at an annual subscription of ten dollars.

Apart from the advantages to be directly derived from membership, there is the special privilege accorded to members of using the College Library on the same conditions as graduates, without being required, however, to make a deposit when books are borrowed.

The members of the Executive Committee are Dr. Johnson, Rev. Dr. Murray, Mr. W. M. Ramsay, Mr. Henry Fry, Mr. G. B. Cramp, and Mr. G. A. Farmer, to any of whom application for membership may be addressed, or to Mr. E. M. Renouf, Secretary, at the Club's Depository, 2238 St. Catherine Street.

McGill Normal School.

The McGill Normal School, in the city of Montreal, is established chiefly for the purpose of training teachers for the Protestant population, and for all religious denominations of the Province of Quebec, other than the Roman Catholic. The studies in this school are carried on chiefly in English, but French is also taught.

Government of the School.

The Corporation of McGill University is associated with the Superintendent of Public Instruction in the direction of the McGill Normal School, under the regulations of the Protestant Committee of the Council of Public Instruction, and it is authorized to appoint a standing committee consisting of five members, called the "Normal School Committee," which shall have the general supervision of the affairs of the Normal School. The following members of the Corporation of the University constitute the committee of the Normal School for the Session of 1903-1904.

Normal School Committee.

PROF. W. PETERSON, C.M.G., LL.D., Principal of the University, Chairman.
MR. SAMUEL FINLEY, Governor of McGill College.
REV. JAMES BARCLAY, M.A., D.D.
J. R. DOUGALL, M.A.
REV. E. I. REXFORD, M.A.
} Fellows of McGill University.
J. A. NICHOLSON, M.A., Secretary.

Officers of Instruction.

MCGILL NORMAL SCHOOL.

SAMPSON PAUL ROBINS, M.A., LL.D., D.C.L., Principal and Lecturer on Art of Teaching.

ABNER W. KNEELAND, M.A., B.C.L., Ordinary Professor of English Language and Literature.
MADAME SOPHIE CORNU, Ordinary Professor of French.
MR. HENRY F. ARMSTRONG, Professor of Drawing.
MISS LILIAN B. ROBINS, B.A., Assistant to the Principal and Instructor in Classics.
MR. W. H. SMITH, Instructor in Vocal Music.
MR. JOHN P. STEPHEN, Instructor in Elocution.
MISS CARRIE M. DERICK, M.A., Lecturer on Botany.
PROF. NEVIL N. EVANS, M.A.Sc., Lecturer on Chemistry.
MR. JAMES WALKER, Instructor in Penmanship and Book-keeping.
MISS LOUISE DERICK, Instructor in Kindergarten Methods.
MR. E. W. ARTHY, Lecturer in the Theory of Kindergarten and Transition Work.
MISS JESSIE Y. CHISHOLM, Instructor in Kindergarten History and Principles.
MISS V. M. HOLMSTROM, Instructor in Calisthenics.
J. A. WILLIAMS, M.D., Lecturer on Physiology and Hygiene.
H. L. BARNES, D.Sc., Lecturer on Physics.
MR. CARL JOHANSSON, Director of Manual Training, McDonald Endowment.
MR. G. E. EMBERLEY, Teacher of Manual Training.
MISS JOSEPHINE T. DOW, Instructor in Cooking.
MISS M. J. CONNOR, Instructor in Sewing.
MISS MATILDA CARDEN, Principal's Secretary and Librarian.

Model Schools of the McGill Normal School.

E. MONTGOMERY CAMPBELL, B.A., Head Master of Boys' School.
MISS MARY I. PEEBLES, Head Mistress of Girls' School.
MISS SELINA F. SLOAN, Head Mistress of Primary School.

Announcement for the Session 1903-1904.

This Institution is intended to give a thorough training to teachers, by instruction and training in the Normal School itself, and by practice in the Model Schools; and the arrangements are of such a character as to afford the greatest possible facilities to students from all parts of the province. The Protestant Central Board of Examiners for the Province of Quebec grants diplomas only to teachers-in-training of this Institution and to graduates of British or Canadian Universities.

The forty-eighth session of this School will commence on the second of September, 1903, and close on the twenty-seventh of May, 1904. The students are graded as follows:—

1.—*Elementary Class.*—Studying for the Elementary Diploma.

2.—*Advanced Elementary Class.*—Studying for the Advanced Elementary Diploma.

3.—*Kindergarten Class.*—Studying for the Kindergarten Diploma.

4.—*Model School Class.*—Studying for the Model School Diploma.

5.—*Class in Pedagogy.*—Preparing for the Academy Diploma.

Detailed information respecting the courses of the four grades first enumerated above may be obtained on application to the Principal of the School, at 32 Belmont St., Montreal.

Academy Diplomas to Graduates.

All holders of model school diplomas that have been granted by the McGill Normal School or that shall hereafter be granted by the Central Board of Examiners shall be entitled to receive Academy diplomas on graduating in Arts at some Canadian or other British university, provided that they pass in Mathematics, Latin, Greek and French at the degree examinations, or, failing this in any subject or subjects of this group, pass in such subject or subjects examinations that are certified by the universities to give to the graduate concerned a standing not lower than that of second class at the end of the Second Year. But graduates who substitute German for Greek, on fulfilling all other conditions, may receive modified Academy diplomas, which will not authorize the holders to become principals of Academies.

All graduates in Arts of Canadian or other British universities who have passed in Mathematics, Latin, Greek and French as above defined and have taken a course and have passed satisfactory examinations in Education and Practical Teaching under the control of the Universities or of the McGill Normal School as approved by the Protestant Committee of the Council of Public Instruction, shall be entitled to receive Academy diplomas. The Central Board of Examiners shall determine who have passed satisfactory examinations in Education and in

Practical Teaching in view of the results, which, including examination questions and answers, shall be remitted to the Board by the university examiners, and in view of the recommendations of the professors of education. The Central Board of Examiners is empowered to set one-half of the questions in Education, and to prescribe the tests of ability to teach and to govern which must be followed in such examinations.

To meet the requirements of graduates and undergraduates in Arts, who, not having previously taken a Normal School course, desire to receive Academy diplomas, and until the Universities themselves undertake the work, provision has been made for the delivery of a course of lectures on pedagogy in the Normal School and for practice in teaching in the McGill Model School for fifty half days, open to graduates in Arts of any British or Canadian university, to undergraduates of the Third Year, and with the permission of the Faculty and the concurrence of the Principal of the Normal School, to those of the Fourth Year. The hours assigned for these lectures are from 3 to 4 p.m. on each Tuesday and Friday on which lectures are given in the Faculty of Arts. An examination on this course of lectures is held annually on the 20th day of May, or on the school day next succeeding that date; the hours are from 10 a.m. to 12 noon.

Undergraduates will be permitted to teach the fifty half days referred to above, during the months of December and May of the Third and Fourth Years of their college course. Graduates will be permitted to teach in the Model Schools at such times as may be agreed on with the Principal. Those who teach in the Model Schools are expected to prepare all lessons and discharge all duties assigned them with faithfulness. Failure to teach or to govern in the Model Schools, as indicated by the percentage of marks taken, no less than failure to pass the examination on the course of lectures, endangers the Academy diploma.

Each person desiring to take this course of study in the Normal School must make application for permision to enter to the Secretary of the Central Board of Examiners, on the authorized form, remitting to him at the same time all necessary certificates of standing and character, and a fee of $4.00. While in attendance on this course each person is subject to the regulations of the said school, and is under the supervision and control of its Principal.

Exemption from Matriculation Examinations in McGill University.

Holders of Model School diplomas of the McGill Normal School who are certified by the Principal of the Normal School to have taken 75 per cent. of the total marks at their final examinations, with not less than 60 per cent. of the marks in Mathematics, French, Latin and Greek respectively, will be admitted without further examination to the First Year in Arts of McGill University; but all such students must make good their standing at the Christmas examinations of the University.

University Examinations.

SESSION 1901-1902.

Faculty of Law.

PASSED FOR THE DEGREE OF B.C.L.

(In order of merit.)

Wainwright, A., B.A.
Astle, T. F.
Cotton, C. M., B.A.
Gariépy, W., B.A.
Duff, A. H., B.A.
Brown, E. N., B.A.
Couper, W. M.
Aylmer, H. U. P.
Ogden, C. G., *aegrotat.*

ADMITTED TO THE DEGREE OF D.C.L. (IN COURSE).

William John White, M.A., B.C.L.

Faculty of Arts.

PASSED FOR THE DEGREE OF B.A.

IN HONOURS.

(In Alphabetical Order.)

First Rank.—Dixon, Jennie D.
Munn, W. Clement.
Nolan, Annie W.

Second Rank.—Adams, Chauncey A.
Bickerdike, May C.
Clogg, Vivian E.
Irving, Elizabeth.
Munn, Emma M.
Warriner, J. Eva.

ORDINARY B.A.

(In order of merit. Students of equal standing are bracketed together.)

Class I.—Crowell, Sam. G.
Harris, Spencer.
Plant, Verner L.
Jack, Milton.
[Reid, Allan S.
[Brodie, Hugh H.

Class II.—Pruyn, Wm. G.
Blagrave, Robt. C.
Smith, Miriam.
McDonald, John A.
Carson, Hermon A.
Irving, Geo.
Cole, G. Edwards.
Walker, John J.

Class III.—Crothers, Harold R.
Day, Daisy.
Greenleese, Mary S.

(In Alphabetical Order.)

Boulter, Jas. Hy.
Brown, Albert Victor.
Mount, Hector P.
Scott, Wm. Jas.
White, D. Roderick.

Aegrotat.—Hitchcock, Caroline L.

STUDENT IN ARTS REGISTERED IN THE MEDICAL FACULTY WHO OBTAINED THE DEGREE OF B.A., IN JUNE, 1902, ON COMPLETING HIS MEDICAL YEAR.

Murphy, Herbert H.

BACHELOR OF SCIENCE ADMITTED "AD EUNDEM GRADUM."

McIntosh, Douglas.

BACHELORS OF ARTS PROCEEDING TO THE DEGREE OF M.A. IN COURSE.

Rexford, Elson I.
Munn, D. Walter.
Rorke, Helen.
Woodley, Edward C.
Millar, Wm. Kinloch.

BACHELORS OF ARTS PROCEEDING TO THE DEGREE OF M.SC. IN COURSE.

LeRoy, Osmund E.
Reid, Lena McK.
McIntosh, Douglas.

PASSED THE INTERMEDIATE EXAMINATION.

(1).—FOR COURSE LEADING TO B.A.

(In order of merit. Students of equal standing are bracketed together.)

Class I.—Rose, Herbert J.
Archibald, John G.
Sheldon, Ernest W.
[Lomer, Theodore A.
[Simpson, Edith P.

Class II.—Hart, E. Muriel.
Mackenzie, Catherine I.
Hindley, J. George.
McKenzie, Angus D. M.
Lathe, Frank E.
Shanks, George.
Dickson, Ada D.
Brown, William Gordon.
Griffin, Grace L.
Gurd, Fraser B.
McGougan, Edward.
McCallum, Orrick B.
Rubinowitz, Israel F.
Wickware, Francis G.
Campbell, D. Grant.
McDonald, Geo. C.
Mingie, Geo. W.
Papineau, Talbot M.
Class III. Freeze, Helen L.
McCally, M. Kathleen.
Henry, A. O. Edna.
MacLeod, Annie L.
Marshall, Wm. W.
Draper, Madolin A.
Gardner, Helen Ivy L.
Chandler, Arthur B.
Wilson, Alice M.
Robertson, Ethel C.
Stewart, Lillian J.
Craig, Bessie.
MacMillan, Henry Hind.
Bell, Ruth.
Bouchard, Myra McL. (*s*).
*Findlay, Delmer C. (*s*).
Logan, David C. (*s*).
McDiarmid, James S. (*s*).
MacFarlane, Charles M. (*s*).
Molson, Walter. (*s*).

Faculty of Applied Science.

PASSED FOR THE DEGREE OF BACHELOR OF SCIENCE.

(In order of merit.)

CIVIL ENGINEERING.

Heaman, John Andrew, London, Ont.
Shaw, Herbert Harold, Brackley Point, P.E.I.
Bigger, Howell, Ottawa, Ont.
Borden, Henry Percy, Kentville, N.S.
Cameron, Kenneth McKenzie, London, Ont.

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* *Stanstead Wesleyan College.*
(*s*) *With supplemental in one subject (arranged alphabetically).*

ELECTRICAL ENGINEERING.

Scott, Harry Evart, Napanee, Ont.
Dunfield, John Collier Withers, St. John's, Newfoundland.
Franklin, Emerson Loran (B.A.), Wolfville, N.S.
Maxwell, Marshall Andrew, St. Stephen, N.B.
Hicks, Thomas Norman, Perth, Ont.
Smith, James Macdonald, Petitcodiac, N.B.
Jackson, Philip T., Toronto, Ont.
Murphy, William Edward, Shelburne, N.S.
Boyd, Hugh Harkness, Montreal, Que.
Higman, Ormond, Ottawa, Ont.
Forman, Andrew Shearer, Montreal.

MECHANICAL ENGINEERING.

Sterns, Frank Ernest, Morrell, P.E.I.
Smith, Gerald Meredith, St. Johns, Que.
Fry, David Merner, Bright, Ont.
Newton, Samuel Robert, Drummondville, Que.
Addie, Thomas Heriot, Sherbrooke, Que.
Baird, Alexander, Sherbrooke, Que.

MINING ENGINEERING.

Corless, Charles Vandyke, New Durham, Ont.
DePencier, Henry Percy, Vancouver, B.C.
Campbell, Charles McKinnon, Winnipeg, Man.
McBride, Wilbert George, Inglewood, Ont.
Coulson, John Leys, Toronto, Ont.
Burchell, George Bartlett, New Campbellton, N.S.

PRACTICAL CHEMISTRY.

Labatt, John Sackville, London, Ont.

ADMITTED TO THE DEGREE OF MASTER OF SCIENCE.

(In Course.)

Burson, Herbert Arthur, B.Sc., St. Catharines, Ont.
Clement, Sheldon Byrne, B.Sc., Kingsville, Ont.
Edwards, William Muir, B.Sc., Montreal.

ADMITTED TO THE DEGREE OF DOCTOR OF SCIENCE.

(In Course.)

Adams, Frank Dawson, B.A.Sc., M.A.,Sc., Ph.D., Montreal.
Dawson, William Bell, B.A., M.A., Ma.E., Ottawa.

Faculty of Medicine.

PASSED FOR THE DEGREE OF DOCTOR OF MEDICINE AND MASTER OF SURGERY.

(*In alphabetical order.*)

Ames, C. A., Field, B.C.
Anthony, T. B., Berwick, N.S.
Baillie, S. A., B.A., Troy, N.Y.

Blair, H. G. F., Ashton, Ont.
Brennan, F. A., St. Albans, Vt., U.S.A.
Byers, J. R., Gananoque, Ont.
Campbell, A., Souris W., P.E.I.
Campbell, J. A. E., B.A., Westmount, Que.
Cantlie, F. P. L., Montreal, Que.
Carter, W. LeM., B.A., Quebec City, Que.
Christie, F. J., Martintown, Ont.
Codrington, R. F., Montreal, Que.
Colby, J. C., B.A., Stanstead, Que.
Coleman, C. E., Chatham, N.B.
Cox, R. B., Collinsville, Conn., U.S.A.
Crozier, J. A., Ashburn, Ont.
Cullen, W. H., Montreal, Que.
Curren, L. M., Springfield, N.B.
Currie, W. D., B.A., Halifax, N.S.
Dixon, J. D., B.A., Montreal, Que.
Dixon, W. E., B.A., Montreal, Que.
Dorion, W. A., Montreal, Que.
Eastman, E. B., Portsmouth, N. H., U.S.A.
Evans, S., Ottawa, Ont.
Featherston, H. C., Hamilton, Ont.
Folkins, H. G., Millstream, N.B.
Forster, J. F. C., Dorchester, N.B.
Gardiner, R. J., Smith's Falls, Ont.
Gardner, W. A., B.A., Huntingdon, Que.
Green, F. W., Pictou, N.S.
Halliday, J. LeR., Sawyerville, Que.
Harris, L. C., Moncton, N.B.
Hart, F. W., B.A., Sackville, N.B.
Harvie, S. K., B.A., Newport, N.S.
Henry, C. M., Palmer, S.D., U.S.A.
Hollingsworth, J. E., Ottawa, Ont.
Hopkins, C. W., Aroostook Junction, N.B.
Hyatt, E. A., B.Sc., Dickinson Centre, N.Y., U.S.A.
Irwin, F., Shelbourne, N.S.
Johnson, J. A., B.A., Lachine, Que.
Johnson, G. R., B.A., Annapolis, N.S.
Jones, N. C., B.A., Gananoque, Ont.
Leney, J. M., B.A., Montreal, Que.
Lidstone, A. E., Aylmer, Que.
Lomas, A. J., Montreal, Que.
MacCarthy, F. H., Ottawa, Ont.
Macdonald, A. A., B.A., St. Andrews, P.E.I.
MacKinnon, G. E. L., Alexandria, Ont.
Maclaren, A. H., B.A., Huntingdon, Que.
MacNaughton, J. A., Salisbury, N. B.
McGibbon, D., Arkona, Ont.
McGibbon, S., Arkona, Ont.
McGrath, R. H., Dorchester, N.B.
McKee, W. E., Coaticooke, Que.
McKenzie, J. B., B.A., Campbellton, N.B.
McNeill, J. F., Kensington, P.E.I.
Manchester, J. W., St. John, N.B.
Martin, H. E., Chatham, Ont.
Mason, E. G., Westmount, Que.
Mason, F. C., Plattsburg, N.Y.

Mason, J. LeD., B.A., Montreal, Que.
May, L. W., Ottawa, Ont.
Menzies, J. E., New Bedford, Mass., U.S.A.
Moffatt, Geo., Inkerman, Ont.
Morrison, J. F., Copleston, Ont.
Morse, W. R., B.A., Laurencetown, N.S.
Mothersill, G. S., Ottawa, Ont.
Palmer, G. H., Dorchester, N.B.
Paterson, R. C., B.A., Montreal, Que.
Peters, O. R., Gagetown, N.B.
Pickard, L. N., Charlottetown, P.E.I.
Pratt, C. M., St. John, N.B.
Ritchie, C. F. P., B.A., Montreal, Que.
Roberts, A. B., Lanark, Ont.
Ship, M. L., B.A., Montreal, Que.
Smith, T. W., Hawkesbury, Ont.
Stockwell, H. K., Danville, Que.
Tolmie, J. A., Moose Creek, Ont.
Tracy, E. A., B.A., Lancaster, N.H., U.S.A.
VanWart, R. McL., B.A., Fredericton, N.B.
Walker, H., Jr., B.A., New York, N.Y., U.S.A.
Williams, R. G., Meaford, Ont.

Faculty of Comparative Medicine and Veterinary Science.

PASSED FOR THE DEGREE OF D.V.S.

(*In alphabetical order.*)

Blair, W. Reid.
Douglas, Alexander R.
Hadwen, Seymour.
Harrington, A. D.
Kennedy, G. A.
Manchester, W.
Spear, W. H.
Symes, J. W.

Scholarships and Exhibitions.

SESSION 1902-1903.

FACULTY OF ARTS.

I. Third Year Scholarships. (Tenable for two years).

Names of Scholars.	Subject of Examination.	Annual Value.	Founder or Donor.
Sheldon, Ernest W.	Mathematics.	$125.00	Sir W. C. Macdonald.
McCally, M. Kathleen.	Mathematics.	81.50	Sir W. C. Macdonald and Molson Fund.
Simpson, Edith P.	Mathematics.	81.50	Sir W. C. Macdonald and Molson Fund.
Lathe, Frank E.	Nat. Science.	125.00	
Rose, Herbert J.	Classical and Mod. Languages.	125.00	Sir W. C. Macdonald.
McKenzie, Angus D. M.	Economics and Pol. Science.	125.00	Mackenzie Scholarship.

Exhibitions. (Tenable for one year).

Names of Exhibitioners.	Subject of Examination.	Annual Value.	Founder or Donor
McDiarmid, James S.	Nat. Science	$100.00	
McGougan, Edward.	Nat. Science	100.00	

II. Second Year Exhibitions. (Tenable for one year).

Names of Exhibitioners.	Annual Value.	Founder or Donor
Fraser, George A.	$125.00	George Hague, Esq.
Idler, S. Mary,	125.00	Sir W. C. Macdonald.
Macmillan, George E.,	75.00	Mrs. Redpath.

Bursaries.—Second Year.

Curtis, Walter E.	$62.50	Sir W. C. Macdonald.
Wales, Osgood H.	62.50	Sir W. C. Macdonald.

III. First Year Exhibitions. (Tenable for one year).

Names of Exhibitioners.	Annual Value.	Founder.
Carr, Wm. L.,	$125.00	
Freedman, Abraham,	100.00	
McLeod, Alex. R.,	125.00	Sir W. C. Macdonald.
Naylor, R. Kenneth,	100.00	
Rorke, Mabele L.,	125.00	
Ryan, Esther L.,	125.00	Sir W. C. Macdonald.

Bursary.—First Year.

Griffin, Constance M.,	$100.00	

FACULTY OF APPLIED SCIENCE.

Exhibitions and Prizes.

STUDENTS ENTERING THE FOURTH YEAR.

Foreman, Alvah E.	British Association Exhibition.
Hall, Oliver.	British Association Prize.

STUDENTS ENTERING THE THIRD YEAR.

Lawrence, William D.	First Mathematical Prize.
Cole, George H.	Second " "
Chaplin, Charles J.	Third " "
Dutcher, Howard K.	Third " "

STUDENTS ENTERING THE SECOND YEAR.

Fyshe, Thomas M.	Scott Exhibition.
Boyle, Robert W.	First Scott Prize.
Blanchet, Guy H.	Second Scott Prize.

PRIZES FOR SUMMER THESES.

In the Electrical Engineering Course: Greenshields Prize, divided equally between R. T. Conklin and A. E. Foreman, Fourth Year.

In the Mechanical Engineering Course: The Crosby Steam Gauge & Valve Company's Prize, to F. A. McKay, Fourth Year.

In the Mining Engineering Course: The Drummond Prize, divided equally between R. A. Chambers, Third Year, and O. Hall, Fourth Year.

Students of the University.

SESSION 1902-1903.

McGILL COLLEGE.

Faculty of Law.

FIRST YEAR.

Coulin, James E., Montreal.
Duffy, Fabian J., Montreal.
Greenshields, Charles G., Montreal.
Harris, Spencer D., Ottawa, Ont.
Mathieu, Alexandre P., Montreal.
McMorran, Thomas S., Ottawa, Ont.
Morin, Louis S. R., St. Hyacinthe, Q.
Wallace, Richard P., Coaticook, Q.

SECOND YEAR.

Brodie, Hugh H., Westmount, Q.
Brosseau, Bernard L., Montreal.
Chipman, Warwick F., Montreal.
Cotton, Wm. Ulric, B.A., Sweetsburg, Q.
DeWitt, Jacob, B.A., Montreal.
Dickson, Norval, Allans Corners, Q.
Drouin, Joseph, Montreal.
Ker, Thomas R., Montreal.
Lafond, Elsée, La baie du Febvre, Q.
McDougall, Malcolm E., Mattawa, Ont.
Mackie, Henry A., Cookshire, Q.
Ogilvie, William Prescott, Montreal.
Phelan, M. A., Montreal.
Pope, Charles Alex., Quebec, Q.
Stephens, L. DeK., Montreal.
Vineberg, Abraham Halmer, Montreal.
Wadleigh, Wilfred William, Kingsay, Q.
Williams, Henry Stevens, B.A., Knowlton, Q.

THIRD YEAR.

Angus, David James, Montreal.
Bergeron, Patrick John, Beauharnois, Q.
Blaylock, Harry W., Danville, Q.
Casgrain, Alex. Chase, Montreal.
Gosselin, Louis, Notre Dame de Stanbridge, Q.
Madore, Louis. Montreal.
MacKinnon, Cecil Gordon, Sherbrooke, Q.
Orr, Henry Stanley, Cookshire, Q.
Rankin, Arthur G. Ernest, Montreal.
Rugg, Frederick S., Stanstead, Q.
Tansey, Thomas M., Montreal.
Theberge, Albert, St. Jerome, Q.
Vipond, Herbert, Montreal.
Weinfield, Henry, (B.A.), Montreal.



The Smithy.



The Foundry.

Faculty of Arts.

FIRST YEAR.

UNDERGRADUATES.

(McGill College.)

Barclay, MacG., Abingdon School, Montreal.
Carr, Wm. L., Huntingdon Academy, Trout River, Q.
Cousins, Geo. V., Westmount Academy, Westmount, Q.
Drew, John M., Lachute Academy, Beech Ridge, Q.
Fisher, Simeon W., Dundas High School, West Flamboro, Ont.
Freedman, Abraham, Montreal High School, Montreal.
Garvin, Arthur C., Stanstead Wesleyan College, Odelltown, Q.
Gibb, Robertson W., Westmount Academy, Westmount, Q.
*Hendry, And. W., Liverpool Academy, Liverpool, N.S.
Henry, Robt. A. C., Westmount Academy, Montreal.
Housser, Geo. E., Portage La Prairie Collegiate, Portage La Prairie, Man.
Hutchinson, Jas. J., Congregational College, Montreal, Craigsholme, Ont.
*Kirsch, Simon, Montreal High School, Montreal.
Lewis, David S., Montreal High School, Montreal.
Lyman, C. Sydney, Montreal High School, Montreal.
McCann, Walter E., M. Dioc. Theol. College, Aylwin, Q.
McLeod, Alex R., Prince of Wales' Coll., P.E.I., Uigg, P.E.I.
Marcuse, Otto, Westmount Academy, Westmount, Q.
Martin, Lewis G., St. John's School, Montreal, Montreal.
Mundie, Gordon S., Westmount Academy, Westmount, Q.
Naylor, R. Kenneth, Shawville High School, Shawville, Q.
Newman, Harry, Montreal High School, Montreal.
Pease, E. Raymond, Montreal High School, Montreal.
Rogers, David B., M. Dioc. Theol. College, Watford, Ont.
Ross, Allan, Montreal High School, Montreal.
Scott, C. Hope, Abingdon School, Montreal, Montreal.
Shearer, Jas. R., Ottawa Collegiate, Sherbrooke, Q.
Silcox, Albert B., Montreal High School, Winnipeg, Man.
Stafford, F. Montague, Montreal High School, Montreal.
Sutherland, O. W. D., Upper Canada College, Montreal.
Vineberg, Solomon, Sherbrooke Academy, Sherbrooke, Q.
Waugh, Oliver S., Montreal High School, Montreal.

Royal Victoria College.

Blakemore, Clarisse M., McGill Normal School, Montreal.
Clark, Birdena M., Harbord St. Coll. Inst., Toronto, Montreal.
Douglas, A. Lilian, Ottawa Coll. Inst., Ottawa.
Fraser, Mabel G. S., Girls' High School, Quebec, Quebec, P.Q.
Gillmor, Blanche C., Trafalgar Institute, Montreal.
Griffin, Constance, Alma Coll., Toronto.
Holway, Ruth, Decorah High School, Decorah, Iowa, U.S.
Massy, Muriel A., Gilman School, Cambridge, Mass., Summerside, P.E.I.
Rorke, Mabele L., St. Thomas Coll. Inst., Montreal.
Ryan, Esther L. M., Montreal Girls' High School, Montreal.
Tully, May G., Victoria High School, B.C., Dawson City, Yukon Terr.

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* *Double Course.*

CONDITIONED STUDENTS.

(McGill College.)

Churchill, Lewis P., Lockeport Academy, Lockeport, N.S.
Crocker, Stanley, Collegiate Inst., St. Thomas, Ont.
Gale, Wm. Hy., Ormstown Academy, Ormstown, Q.
*Healy, Jas. J., Smith's Falls High School, Smith's Falls, Ont.
Kiely, Philip G., Goderich Coll. Inst., Goderich, Ont.
*McCallum, Jno. S., Smith's Falls High School, Smith's Falls, Ont.
Patrick, Frank A., Montreal High School, Montreal.
Payne, Chester H., Ottawa Collegiate Inst., Ottawa, Ont.
Shaw, Herbert T., Montreal High School, Montreal.
Stackhouse, Russell T., Lachute Academy, Lachute, Q.
Thomson, Jos. O., Montreal High School, Montreal.
Vassie, Wm., Ridley College, St. John, N.B.

(Royal Victoria College.)

Carter, Helen M., Trafalgar Inst. & Royal Victoria Coll., Montreal.
Engelke, Minnie E., Montreal High School, Montreal.
Mowatt, E. L. Rae, Montreal Girls' High School, Montreal.
Taylor, Eliz. I., Wells Coll., Rochester, N.Y., U.S.
Tighe, M. Winnifred, Westmount Academy, Westmount, Q.
Trench, Nora O., Richmond High School, Va., U.S., Montreal.

PARTIAL STUDENTS.

(McGill College.)

Allison, Wm. S., St. John, N.B.
Archibald, B. P., Westmount, Q.
Armstrong, Geo. D., Ottawa, Ont.
Barrett, Chas. W., Newcastle, Ont.
Bates, Fred. W., Wolford Centre, Ont.
(2) Cordner, Jos., Derryall, Ireland.
Haskell, L., St. J., Montreal.
Howe, Jno. P., Pembroke, Ont.
Hannah, Rich. M., Copper Cliff, Ont.
Johnston, David E., Coleraine, Ont.
Kennedy, H. F., Chatham, Ont.
McCrimmon, Jno. R., Vankleek Hill, Ont.
Mackay, Robt.
Mather, Wm. A., Rat Portage, Ont.
Maver, Alex. M., Montreal.
(2) Morgan, W. Burton, Hartland, N.B.
Peterson, Wm. Gordon, Montreal.
Phillips, Thos. N., Rat Portage, Ont.
Richards, Wm. A., Pembroke, Ont.
Robb, Fred G., Montreal.

(Royal Victoria College.)

Baker, Marjorie H., Montreal.
Bell, Muriel G., Montreal.
Bell, Sarah L., Montreal.
Blakemore, Jessie M., Montreal.
(2) Braidwood, H., Montreal.
(2) Brodie, Mary R., Smith's Falls, Ont.

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* *Double Course.*

The figure (1), (2), (3) or (4) prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

Brotherhood, E. M., Montreal.
Brown, E. M., Montreal.
Bulmer, Gertrude, Montreal.
(4) Cox, Rachael E., Montreal.
Chapman, G. O., Amherst, N.S.
Cross, Margt, Montreal.
Draper, E. Kath., Montreal.
Durant, Marion, Montreal.
Eaton, Mary J., Montreal.
Edgar, L. M., Montreal.
Emmans, H., Montreal.
Fitzgibbon, O., Montreal.
Fogarty, Amy, Montreal.
Fogarty, Lena M., Montreal.
Forbes, M. H., Montreal.
Fortier, Aimée, Montreal.
Gibb, M. Helen, Montreal.
(2) Gilmour, Mary E., Waterloo, Q.
Gnaedinger, Ruby A., Montreal.
Harris, Mary E., Moncton, N.B.
Hewat, H. Beatrice, Montreal.
Hodge, L. Ethel, Montreal.
Lachance, Maud M., Montreal.
Learmonth, F. Win., Montreal.
(2) Lomer, Elfreda, Montreal.
(2) Lomer, Katharine, Montreal.
Lyster, Alice G., Montreal.
McNally, Gertrude, Montreal.
Macfarlane, E. J., Montreal.
Mackay, Cairine, Montreal.
(2) Mitchell, Florence E., Sherbrooke, Q.
Mole, Harriet J., Montreal.
Robb, E. Vera, Amherst, N.S.
Robertson, Marjorie B., Montreal.
Smith, Mabel C., Montreal.
(2) Smith, Jennie C., Morrisburg, Ont.
(4) Taylor, Agnes D., Edinburgh, Scotland.
Vipond, Constance, Montreal.
Williams, Ethel S., Montreal.
Williamson, F. I., Montreal.
Williamson, H. J., Montreal.
Young, Hazel E., Montreal.

SECOND YEAR.

UNDERGRADUATES.

(McGill College.)

Adams, Claude A., Huntingdon Acad., Franklin Centre, Q.
Blanchard, Charles H. S., Upper Canada Coll., Toronto, Winnipeg, Man.
Cameron, A. W., Montreal High School, Montreal.
Chodat, Henri, Normal School, Switzerland, Pointe-aux-Trembles, Q.
Cotton, Thos. F., Montreal High School, Cowansville, Que.
Cousineau, Victor M., Ontario Public Schools and M. Dioc. T. Coll., Spragge, Ont.
Crane, Chas. W., Toronto University, Montreal.
Cross, C. Ernest, St. Francis Coll. Gram. School, Melbourne, Q.

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

*Curtis, Walter E., Prince of Wales Coll., P.E.I., Milton, P.E.I.
Cushing, R. Macaulay, Montreal High School, Montreal.
Dawson, Ernest E., Lachute Acad., Stonefield, Q.
Dey, W. Fred., Simcoe High School, Simcoe, Ont.
Edwards, Lyford P., Central High School, Grand Rapids, Grand Rapids, Mich., U.S.A.
Featherston, J., University Coll., Toronto, Ont.
Fraser, Geo. A., Montreal High School, Montreal.
Graham, Jno. H., Manitoba Coll., Winnipeg, Man.
Greenshields, C. G., Bishop's Coll. School, Lennoxville, Montreal.
Halpenny, T. A. Sydenham High School, Bear Brook, Ont.
Howitt, Hy., Montreal High School, Guelph, Ont.
Hyde, G. Gordon, Montreal High School, Montreal.
Jenkins, Jos., Montreal High School, Montreal.
King, Louis V., Montreal High School, Montreal.
*Locke, Ernest E., Westmount Academy, Westmount, Q.
McCuaig, Douglas R., Crichton School, Montreal.
McFee, M. C. C., Montreal High School, Montreal.
Macmillan, G. E., Prince of Wales Coll., New Haven, P.E.I.
McMurtry, R. O., Montreal High School, Montreal.
Macnab, Norman, Montreal High School, Montreal.
Manley, R. W., M. Dioc. Theol. Coll., Buckingham, Q.
Nicholson, Jno. C., Owen Sound, Lucknow, Ont.
Ower, Jno. Jas., Smith's Falls High School, Smith's Falls, Ont.
Perry, K. M., Regina High School, Regina, Assa.
*Rabinovitch, M., Montreal High School, Montreal.
Robinson, F. G.,Bishop's Coll. School, Lenn'le, St. John, N.B.
Robinson, W. W., Bishop's Coll. School, Lenn'le, Granby, Q.
Ross, Daniel, Montreal High School, Montreal.
Roy, Philias R., Feller Inst., Grande Ligne, Q., Sabrevois, Q.
Stewart, Thomas S., Crichton School, Montreal.
Stewart, Willie, Crichton School, Montreal.
*Tannenbaum, D., High School, Montreal.
Tupper, Chas. S., Upper Canada School, Private Tuition, Winnipeg Man.
Wales, Osgood H., Danville Acad., Robinson, Q.
*(Sc.) Wright, Robt. P.

(Royal Victoria College.)

Bowman, Nora F. G., Glencoe High School, Ont., Montreal.
Featherstonhaugh, M. R., M. G. High School, Montreal.
Fraser, Amy, M. G. High School, Montreal.
Gillean, A. Muriel, M. G. High School, Montreal.
Healy, Rose E., Smith's Falls High School, Smith's Falls, Ont.
Hepburn, Flora E., M. G. High School, Lachine, Q.
Hill, Julia M., St. Stephen's High School, St. Stephen, N.B.
Hitchcock, Mary A., Stanstead Wesl. Coll., Compton, Q.
Idler, S. Mary, M. G. High School, Montreal.
Lyman, Ruth D., Trafalgar Institute, Montreal.
McCoy, Isabel, Montreal Girls' High School, Montreal.
Michaels, R. F., M. G. High School, Montreal.
Moule, Frances S., Westmount Acad., Westmount, Q.
Munn, Laura A., M. G. High School, Montreal.
Pearson, Mary F., Edgehill, Windsor, N.S., Emscote, Halifax, N.S.
(Sc.) Sharp, F. Evelyn, London University Coll., London, Southfield, Jamaica, W.I.
Smith, Ella L., Grammar School, St. John, St. John, N.B.
Smith, May, M. G. High School, Montreal.
Taber, Marion M. D., Stanstead Wesleyan Coll., South Granby, Q.
Vineberg, Malca, M. G. High School, Montreal.

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* *Double Course.*

PARTIAL STUDENTS.

(McGill College.)

Bourgoin, Samuel, Pointe-aux-Trembles, Q.
Foote, Jas., Varna, Ont.
Gurd, Walter.
(3) Halpenny, Wes., Tucker, Montreal.
Joliat, Henri, Montreal.
Lancaster, Chas. F., Bethany, C.
Mackenzie, Jno. D., Inverness, Q.
Mackay, Jas., St. Davids, Ont.
Mathieson, Peter, Forester's Falls, Ont.
Molson, Herbert W., Montreal.
Montgomery, Isaac, Pleasant Valley, Ont.
Ormiston, Albert, Columbus, Ont.
Robinson, Jas. C., Nobleton, Ont.
Raymond, Wm. O.
Stewart, Jno. A.

(Royal Victoria College.)

Armstrong, Beatrice, M., Montreal.
Binks, Isabel B., Montreal.
(4) Boulter, O., Montreal.
Demole, A. M., Montreal.
Jackson, E. M., Montreal.
Kerr, Vera O., Montreal.
Knox, M. Gertude, Montreal.
Lewis, Edith B., Westmount, Q.
(3) (4) Logan, Winnifred, Montreal.
(3) Murray, Bessie C., Montreal.
Murray, Grace P., Montreal.
Prendergast, F. M., Montreal.
Schoenthal, Y. E., Westmount, Q.

THIRD YEAR.

UNDERGRADUATES.

(McGill College.)

Archibald, John G., Montreal.
Brown, Wm. G., Montreal.
Campbell, D. Grant, Montreal.
Chandler, Arthur B., Montreal.
*Dickenson, John D., Hazel Hill, N.S.
*Fripp, Geo. D., Ottawa, Ont.
*Gray, Edwin H., Montreal West, Q.
*Gurd, Fraser B., Montreal.
*Harvie, Robt., Westmount, Q.
Hindley, J. Geo., Guelph, Ont.
Lathe, Frank E., Lacolle, Q.
Logan, David C., Montreal.
*Lomer, Theodore A., Montreal.
MacFarlane, Charles McK., Aubrey, Q.
*McDiarmid, J. S., Ingersoll, Ont.

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* *Double Course.*

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

McDonald, George C., Montreal.
McGougan, Ed., Glencoe, Ont.
McKenzie, Angus D. M., Hartsville, P.E.I.
Marshall, Wm. W.. Montreal.
Mingie, Geo. W., Point St. Charles, Q.
Molson, Walter, Montreal.
Papineau, Talbot M., Montreal.
Rose, Herbert J., Ottawa.
Rubinowitz, I., Vancouver, B.C.
Shanks, George, Howick, Q.
Sheldon, Ernest W., Westmount, Q.
Stewart, J. Ure., Goderich, Ont.
Walker, H. Earle, Westmount, Q.
*Wickware, Francis G., Easton's Corners, Ont.

(*Royal Victoria College.*)

Bell, Ruth, Westmount, Q.
Bouchard, Myra McL., Montreal.
Craig, Bessie, Montreal.
Dickson, Ada, Pembroke, Ont.
Draper, Mandolin A., Montreal.
Ellison, Ada A., Cowansville, Q.
Freeze, Helen L., St. John West, N.B.
Gardner, H. Ivy L., Montreal.
Griffin, Grace L., Toronto.
Hadrill, Margaret F., Montreal.
Hart, E. Muriel, St. Lambert, Q.
Henry, A. E. Edna, Tamworth, Ont.
Kimber, Victoria C., Montreal.
McCally, M. K., St. Thomas,. Ont.
MacKenzie, Catherine I., Montreal.
MacLeod, Annie L., Glace Bay, C.B.
Robertson, Ethel C., Westmount, Q.
Simpson, Edith P., Montreal.
Stewart, Lillian J., Ottawa.
Wilson, Alice M., Montreal.

PARTIAL STUDENTS.

(*McGill College.*)

Dunlop, Alan C., Montreal.
(4) McLeod, N. V., Granby, Q.
May, Wm. H., Forester's Falls, Ont.
Ross, Walter G., Upter Grove, Ont.

(*Royal Victoria College.*)

Armstrong, H. Evelyn, Montreal.
Baird, I. Lena, Andover, N.B.
(4) Molson, E., Montreal.
(4) Murray, Greta, Montreal.
Newman, J. G., Montreal.
Patrick, Agnes B., Montreal.
Reekie, I. G., Montreal.
Scrimger, E. Muriel, Montreal.
(4) Stanway, H. Winifred, Montreal.

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* *Double Course.*

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

Spencer, Lilian E., Montreal.
Stewart, G. Grace, Belleville, Ont.
Sutherland, Alice D., Montreal.
(4) Walker, Gladys, Toronto, Ont.

FOURTH YEAR.

UNDERGRADUATES.

(McGill College.)

Ascah, R. G., Peninsula, Gaspe, Q.
Bovey, F. H. Wilfrid, Montreal.
Cameron, Dakers, Montreal.
Couture, Gui. C., Montreal.
Davidson, Macfarlane B., Ottawa.
Dutaud, Gustave, St. Blaise, Q.
Fee, James E., Farnham, Q.
*Harris, Alan Dale, Ottawa.
Holman, Wm. L., Summerside, P.E.I.
Johnson, Walter S., Montreal.
Lockhart, A. R. B., Stanstead, Q.
Lomer, Gerhard R., Montreal.
MacKay, Eric B., Montreal.
McMorran, T. S., Ottawa.
Parkins, Edgar R., Montreal.
Seaman, Jno. C., Otter Lake, Q.
Simister, Warren, Montreal.
Troop, G.Wm. H., Montreal.

(Royal Victoria College.)

Belyea, Marion E., St. John, N.B.
East, Edith M., Maisonneuve, Q.
(Sc.) Gass, Helen, Montreal West, Q.
Griffin, A. Gertrude, West Newton, Mass., U.S.A.
Lundie, Helen, Montreal.
Lunny, Rosemary, Smith's Falls, Ont.
McLeod, Euphemia L., Montreal.
Parkin, Maude E., Toronto.
Wales, Grace Julia, Robinson, Q.
Wisdom, Katherine F., St. John, N.B.

PARTIAL STUDENTS.

(McGill College.)

Tippett, E. H., Montreal.

(Royal Victoria College.)

Blackader, E. M., Montreal.
Fyshe, Anna, Montreal.
Gates, Fanny C., Baltimore, Ind., U.S.
Hickson, B., Montreal.
Robinson, F. P., Bristol, England.
White, Ada W., Montreal.

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* *Double Course.*

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

GRADUATES.

Clogg, Vivian E., B.A., Montreal.
Cameron, Susan E., M.A., St. John, N.B.
Dalgleish, R. W., B.A., Huntingdon, Q.
Mitchell, Sydney, B.A., Montreal.
Nolan, A. Winifred, B.A., Montreal.
Pearson, Katie C., B.A., Montreal.
Shaw, S. Louise, B.A., Montreal.

Faculty of Medicine.

FIRST YEAR.

UNDERGRADUATES.

Allen, Hanson, C.B., Cape Tormentine, N.B.
Baird, Walter S., Brucefield, Ont.
Bayley, Alexander H., Bridgetown, Barbados, B.W.I.
Budyk, James S., Montreal.
Burke, George H., Ogdensburg, N.Y., U.S.A.
Chandler, Arthur B., Montreal.
Christie, Hugh H., Martintown, Ont.
Clarke, Frederick C., Coverley Plantation, Barbados, B.W.I.
Cole, William H., Westmount, Q.
Crowe, Henry S., Central Onslow, N.S.
*Curtis, Walter E., Milton, P.E.I.
Dearborn, Henry F., Lawrence, Mass., U.S.A.
Des Isles, Charles J. R., Montreal.
Donnelly, James H., Iroquois, Ont.
Elliott, Milton H., Prescott, Ont.
Field, Burton R., Port Elgin, N.B.
Flagg, Robert F., Ottawa, Ont.
Fraser, David R., Montague Bridge, P.E.I.
Fraser, Thomas B., Liverpool, N.S.
*Fripp, George D., Montreal.
Gillies, George E., Teeswater, Ont.
Gourlay, Henry B., Ph.B., Montreal.
*Gray, Edwin H., Montreal West, Q.
Green, Thomas B., B.A., Virden, Man.
Groves, Osler M., Carp, Ont.
Gunn, Alexander R., Lancaster, Ont.
*Gurd, Fraser B., Montreal.
*Healy, James J., Smith's Falls, Ont.
Henderson, Smith, Ottawa, Ont.
*Hendry, Andrew W., Liverpool, N.S.
Hillman, Oliver S., Hamilton, Ont.
Hils, Herman, B.L., Woonsocket, R.I., U.S.A.
Hollbrook, Robert E., Boissevain, Man.
Holden, Charles P., St. John, N.B.
Howlett, George P., Ottawa, Ont.
Hunter, Archibald W., Durham, Ont.
Hunter, Thomas V., Florenceville, N.B.
Huycke, Austin H., Warkworth, Ont.
Johnson, Brougham F., Midland, N.B.
Keddy, Owen B., Milton, N.S.
Kelly, Arthur E., Meaford, Ont.
Kennedy, William, Bradalbane, P.E.I.
Kerfoot, Herbert W., Smith's Falls, Ont.
Kinloch, Charles A., Martintown, Ont.
*Kirsch, Simon, Montreal.
Lahey, John J., Southboro, Mass., U.S.A.
Lewis, Henry R., Hillsborough, N.B.

* *Double Course.*

Lindsay, Edwin A., Banff, Alta.
*Locke, Ernest E., Westmount, Q.
*Lomer, Theodore A., Montreal.
Lyon, George R. D., Ottawa, Ont.
MacArthur, Reginald S., Summerside, P.E.I.
MacDonald, Purdy A., Alma, N.B.
MacNaughton, Alexander, North Lancaster, Ont.
*McCallum, John S., Smith's Falls, Ont.
McCormick, Alexander S., Westmount, Q.
*McDiarmid, James S., Ingersoll, Ont.
McDonald, John N., Shelburne, N.S.
McGarvey, Owen, Ottawa, Ont.
McLeod, John M., Quincy, Mass., U.S.A.
McMillan, John A., Finch, Ont.
McNaughton, George K., Black River, N.B.
McPhee, Judson T., Courtenay, B.C.
Mabee, Oliver R., Ph.B., Vittoria, Ont.
Mair, William L., Clinton, Ont.
Malcolm, Donald C., St. John, N.B.
Michaud, Napoleon, Campbellton, N.B.
Monahan, Richard J., Montreal.
Muir, David H., Jr., Truro, N.S.
Muir, Walter L., Truro, N.S.
Munroe, Alex. R., Woodstock, Ont.
Munroe, Frederick D., Moose Creek, Ont.
Parsons, William H., Harbour Grace, Nfld.
Patterson, William J., B.A., Moncton, N.B.
Payne, Gerard A. L., Georgetown, British Guiana.
Peat, Gilbert B., Andover, N.B.
*Rabinovitch, Max, Montreal.
Ralph, Albert J., Montreal.
Ritchie, Charles A., B.A., Winnipeg, Man.
Rodrigues, Emanuel T., St. Kitts, W.I.
Rothwell, Oswald E., B.A., Regina, N.W.T.
Ryan, Edward J., St. John, N.B.
Scott, Walter H., Edmonton, N.W.T.
Shaw, Robert McL., B.A., Penobsquis, N.B.
Sheahan, John J., Haley's Station, Ont.
Sims, Herbert L., Ottawa, Ont.
Smith, Arthur B., Montreal.
Stewart, Robert L., Pembroke, Ont.
Strachan, Ernest D., Montreal.
*Tannenbaum, David, Montreal.
Thomson, George D., Montreal.
Tilley, Alexander R., Ottawa, Ont.
Walker, Jno. J., B.A., Ormstown, Q.
Wallace, Carl T., Eureka, Cal., U.S.A.
Weldon, Richard C., Jr., Halifax, N.S.
White, John H., Ottawa, Ont.
Williams, Cyril S., Tyne Valley, P.E.I.
Wilson, Arthur A., Perth, Ont.
Wolff, Edward K., Montreal.
*Wright, Robert P., Montreal.

CONDITIONED STUDENTS.

Bonness, Elmond J., St. Stephen, N.B.
Gabie, William G., Kazubazua, Q.
Gross, Charles J., Montreal.
Hammond, James F., Ironside, Q.
McArthur, Clarence O., Summerside, P.E.I.
Shipley, Charles E., East Amherst, N.S.
Turnbull, James W., Springhill, Ont.

* *Double Course.*

PARTIAL STUDENTS.

Kelsea, William H., Lansdowne, N.S.
Ross, Colin E., Westmount, Q.
Ship, Abraham P., Montreal.
Sparks, John J., St. John's Nfld.

SECOND YEAR.

UNDERGRADUATES.

Alguire, Alexander R., Cornwall, Ont.
Auld, John W., Vancouver, B.C.
Bonelli, Vincent, Jr., B.A., Vicksburg, Miss., U.S.A.
Bromley, John E., Pembroke, Ont.
Brown, Fred. F., Cornwall, Ont.
Brown, Gordon T., Danville, Q.
Burgess, Harry C., Sheffield Mills, N.S.
Cameron, Allan B., Lancaster, Ont.
Chisholm, Hugh A., B.A., Linwood, N.S.
Connor, Edward L., Waterloo, Ont.
Costello, Joseph W. W., B.A., Montreal.
Covernton, Charles F., Montreal.
Cumming, Alison, B.A., Scotsburn, N.S.
Dalton, James T., St. John, N.B.
Dougan, Benjamin H., St. John, N.B.
Dowler, William H., Billings Bridge, Ont.
Dudderidge, Charles R., B.A., Winnipeg, Man.
Duggan, Richard G., Hamilton, Ont.
Dykes, J. Watson, Nanaimo, B.C.
Ewart, David, Billings' Bridge, Ont.
Fairie, James A., Montreal.
Finigan, Joseph F., Oshawa, Ont.
Garcelon, William S., B.A., Lewiston, Maine, U.S.A.
Gaudet, Elzear A., B.A., Moncton, N.B.
Gill, Frederic D., St. John's, Newfoundland.
Greene, Henry B., Lyndhurst, N.S.
Grimmer, Ray D., St. Andrews, N.B.
Hanington, Darrell P., Victoria, B.C.
Hanington, John W. B., Victoria, B.C.
Heagerty, John J., Montreal.
Henderson, Ernest H., B.A., Huntingdon, Q.
Henry, Edward G., B.A., Lennoxville, Q.
Hewett, Thomas J., Montreal.
Hume, Gordon M., Leeds Village, Q.
Joughins, James L., Los Angeles, Cal.
King, James L., Barbados, B.W.I.
King, Shenton S., Albert, N.B.
Leslie, Howard A., Souris, P.E.I.
Likely, David S., B.A., St. John, N.B.
Loggie, William S., Chatham, N.B.
MacDermot, John H., Kingston, Jamaica.
MacDonald, John P., Ste. Agathe des Monts, Q.
MacKay, Malcolm E., Cape Breton, N.S.
MacLean, John D., Culloden, P.E.I.
McDonald, John A., B.A., Valleyfield, Q.
McDonald, John C., Peake's Station, P.E.I.
McDougald, Wilfred L., Cornwall, Ont.
McIntosh, Gustavus J., Dalkeith, Ont.
McMeekin, Robert J., M.D., Plattsville, Ont.
McMicking, Antony E. T., Victoria, B.C.
McMurtry, Shirley O., B.A., Montreal.
McMurtry, Walter C., Port Hope, Ont.
McNaughton, William B., St. Raphael, Ont.

Margolese, Oscar, Montreal.
Mason, James H., Lachute Mills, Q.
Mercer, Thomas C., Chilliwack, B.C.
Mersereau, Harris C., Doaktown, N.B.
Miller, Allan P., Chatham, Ont.
Mohr, Frederick W.C., Arnprior, Ont.
Moffatt, Charles F., Montreal.
Morrison, John C., Nanaimo, B.C.
Muckleston, Harold S., M.A., Perth, Ont.
Mulligan, James W., Omemee, Ont.
Munro, John A., Pugwash, N.S.
Nelles, Thomas R., Simcoe, Ont.
Petersky, Samuel, Vancouver, B.C.
Prendergast, Archer R., B.A., Montreal.
Pruyn, William G., Napanee, Ont.
Raftery, Charles R., Montreal.
Richards, Ernest T. F., St. Vincent, B.W.I.
Robertson, Alexander R., Victoria, B.C.
Robertson, Beverley W., St. John, N.B.
Rommel, Ernest, Alma, N.B.
Ryan, Florance McD., B.A., Newburgh, Ont.
Sawyer, Alpha R., Roslindale, Mass., U.S.A.
Scott, William J., B.A., Montreal.
Scrimger, Francis A. C., B.A., Montreal.
Sinclair, Ernest E., Summerside, P.E.I.
Soady, John H., B.A., Toronto, Ont.
Somerville, Harry A., Waterville, Q.
Styles, William A. L., Montreal.
Sullivan, James A., Arnprior, Ont.
Sweeney, John L., B.A., Dover, N.H., U.S.A.
Tees, Frederick J., B.A., Montreal.
Tierney, James E., Niagara Falls, N.Y., U.S.A.
Tull, John A. C., Antigua, B.W.I.
Turnbull, Ernest G., Branchton, Ont.
Valin, Romuald E., Ottawa, Ont.
Viner, Norman, B.A., Montreal.
Waterman, Chester, Ogdensburg, N.Y., U.S.A.
Wilkinson, William M., Woodstock, Ont.
Wood, Gilbert O., Kenmore, Ont.
Wotherspoon, Hugh C., Montreal.
Young, Charles A., Ottawa, Ont.

PARTIAL STUDENT.

Cunningham, Frederick J., Montreal.

THIRD YEAR.

UNDERGRADUATES.

Ainley, Lawrence T., B.A., Almonte, Ont.
Ainley, William E., B.A., St. George, Bermuda.
Alford, John H., Ottawa, Ont.
Anton, Duncan L. S., Montreal.
Arnold, Duncan R., B.A., St. John, N.B.
Atkinson, Hubert S., Hants Harbour, Newfoundland.
Bentley, John S., B.A., Truro, N.S.
Black, John C., Oxford, Ont.
Boire, William E., Manchester, N.H., U.S.A.
Bonin, Raoul P., Montreal.
Charman, Frank D., Wallace, N.S.
Chipman, William W., Ottawa, Ont.
Coffin, John W., Mt. Stewart, P.E.I.
Cook, William J., Coboconk, Ont.

Crack, Isaac E., B.A., Kingsbury, Q.
Crosby, Percy C., Marshfield, P.E.I.
Crowell, Bowman C., B.A., Yarmouth, N.S.
Davidson, Harry, D. J., Sherbrooke, Q.
Dillon, William P., Iroquois, Ont.
Douglas, Edgar, B.A., Halifax, N.S.
Dunn, John F., Elgin, Ont.
Eaton, Charles E., Stanbridge East, Q.
Ernandez, Joseph A., Spanish Town, Jamaica, B.W.I.
Faulkner, James A., B.A., Stirling, Ont.
Fisher, Ernest M., Blue Bonnets, Q.
Folkins, Clarence G., Millstream, N.B.
Ford, Henry S., Vancouver, B.C.
Fraser, Samuel, Leeds, Q.
Fyshe, James C., A.B.
Gibson, Gordon M., Huntingdon, Q.
Gibson, Richard, Nanaimo, B.C.
Gillis, John E., Darlington, P.E.I.
Gilroy, James R., Springhill, N.S.
Gormely, Joseph C., Finch, Ont.
Graham, Richard W., Sawyerville, Q.
Grant, Nelson P., Woodstock, N.B.
Greenwood, William T., St. Catharines, Ont.
Harrison, Laurie L., B.A., Maceau, N.S.
Hogan, Frederick J., Tignish, P.E.I.
Hotchkiss, Ernest A., Collinsville, Conn., U.S.A.
Howitt, Henry O., Guelph, Ont.
Inksetter, Frank S., Dundas, Ont.
Johnson, John G. W., B.A., Montreal.
Judson, Arthur H., Lynn, Ont.
Kerr, Harry H., Washington, D.C., U.S.A.
Keys, James M., Hulbert, Ont.
Lauchland, Lyman C., B.A., Oshawa, Ont.
Lincoln, William A., Stanstead, Q.
Lippiatt, Havelock T., Abbotsford, Q.
Losier, Arthur J., Tracadie, N.B.
MacKenzie, Angus B., Springfield, P.E.I.
MacKid, Ludwig S., Calgary, Alta.
McIntosh, Lorne DeC., Dundela, Ont.
McKenty, Esau R., Bath, Ont.
McKenzie, Robert P., Plainfield, Ont.
McLachlan, Donald C., Lochaber Bay, Q.
McLeod, William A., Finch, Ont.
Markson, Simpson M., Glen Robertson, Ont.
Martin, John C., Whitechurch, Ont.
Meakins, John C., Hamilton, Ont.
Miller, Clarence, Stellarton, N.S.
Miller, Verum L., Bear River, N.S.
Murphy, Herbert H., B.A., Antrim, Ont.
Nagle, Sarsfield M., Almonte, Ont.
Nutter, John A., B.A., Montreal.
Pavey, Charles A., London, Ont.
Preston, Charles E., Ottawa, Ont.
Price, Joseph, Campbellton, N.B.
Quain, Bernard P., Brushton, N.Y.
Rankin, Allan C., Montreal.
Reford, Lewis L., B.A., Montreal.
Richardson, Charles A., East Jefferson, Me., U.S.A.
Richardson, Cheslie A. C., B.A., Sydney, C.B.
Rilance, Charles D., Montreal.
Robinson, John L., St. Mary's, Ont.
Rogers, James T., B.A., Montreal.
Sellery, Albert C., Kincardine, Ont.
Shillington, Richard N. W., Ottawa, Ont.
Sims, Haig A., Montreal.

Smith, William A., B.A., Almonte, Ont.
Stewart, John A., Norborough, P.E.I.
Warwick, Wm., St. John, N.B.
White, Percival G., Woodstock, Ont.
Wigle, Charles A., Wiarton, Ont.
Willmore, James G., Montreal.
Wilson, Omar M., Smith's Falls, Ont.
Wilson, Thomas R., B.A., Carp, Ont.
Winder, John B., Compton, Q.
Winfrey, William C., B.L., Sault Ste. Marie, Mich., U.S.A.
Wood, Harry G., Faribault, Minn., U.S.A.
Wood, William H., Montreal.
Wright, George A., Stony Creek, N.B.
Yorston, Frederic P., M.A., Montreal.

CONDITIONED STUDENT.

Briggs, John A., New Westminster, B.C.

PARTIAL STUDENT.

Bullock, Curtis C. A., Roxton Paut, Vt., U.S.A.

FOURTH YEAR.

UNDERGRADUATES.

Allan, Robert, Montreal.
Allum, Arthur W., Renfrew, Ont.
Anderson, Charles W., B.A., Halifax, N.S.
Andrews, John J., St. Lambert, Q.
Bailey, George W., Fredericton, N.B.
Bishop, George A., Kinburn, Ont.
Bishop, Leslie C., Mableton, P.Q.
Blakeman, Fred. W., Stratford, Ont.
Blair, Alexander K., Chicoutimi, Q.
Boulter, James H., B.A., Picton, Ont.
Boyd, Oliver, Russell, Ont.
Boyd, Robert M., Belleville, Ont.
Brooks, John E., B.A., Eastport, Maine, U.S.A.
Burns, Arthur S., B.A., Newton Highlands, Mass., U.S.A.
Campbell, Walter G., Brantford, Ont.
Carnochan, William L. C., Montreal.
Chamberlain, Harry B., Perth, Ont.
Chandler, Ernest C., Montreal.
Chaplin, Herbert L. S., St. John's, Newfoundland.
Church, Harry C., Chelsea, Q.
Cowperthwaite, Hugh H., St. John's, Newfoundland.
Cram, William J., Carleton Place, Ont.
Croft, Laurance V., B.A., Middleville, Ont.
Cumming, William G., B.A., Montreal.
Dickson, Archibald J., B.A., Goderich, Ont.
Dickson, William H., Pembroke, Ont.
Donnelly, William H., Ogdensburg, N.Y., U.S.A.
Douglas, Frederick C., Montreal.
Dowson, Charles K., Montreal.
Doyle, Francis H., Natick, Mass., U.S.A.
Ebbett, Percy L. B., Gagetown, N.B.
Elder, Robert, B.A., Trout River, Q.
Ells, Robert H., B.A., Ottawa, Ont.
English, John M., New Westminister, B.C.
Ferguson, William H., St. Thomas, Ont.
Forbes, Robert D., Stratford, Ont.
Fortin, Claude E. T., B.A., Winnipeg, Man.

Freeze, Edwin, Penobsquis, N.B.
Frost, Anson C., Montreal.
Gale, Withall P., Quebec, Q.
Gilmour, Clifford R., Brockville, Ont.
Gow, Robert J., Pevey, Ont.
Hansen, Niels C., M.A., Portland, Maine, U.S.A.
Hardisty, Richard H. M., B.A., Westmount, Q.
Horsfall, Frank L., B.A., Montreal.
Hynes, William T., Darnley, P.E.I.
Igoe, Owen A., Tarrytown, N.Y., U.S.A.
Kenny, Richard W., Ottawa, Ont.
King, Robert, B.A., Sackville, N.B.
Kissane, John W., Chateauguay, N.Y.
Lamb, Warwick V., St. Andrews, N.B.
Laurie, Ernest, B.A., Montreal.
Lundie, John A., B.A., Montreal.
Lyman, Warren S., Ph.B., Knoxville, Tenn., U.S.A.
Lynch, Arthur L., Ottawa, Ont.
Macdonald, Ronald St. J., Bailey's Brook, N.S.
Mackenzie, William A., Wood Islands, P.E.I.
Mackinnon, Ivan W., Charlottetown, P.E.I.
McCulloch, Joseph M., Durham, Ont.
McDiarmid, Colin A., Kemptville, Ont.
McDonald, Stephen H., B.A., St. John, N.B.
McDonald, Paul Alex., Dundee Centre, Q.
McEachern, Isaac W. T., Rockland, Ont.
McEwen, John R., B.A., Dewittville, Q.
McGrath, Francis C., Norway, P.E.I.
McGuigan,, James D., Kelly's Cross, P.E.I.
McKechnie, David W., Dundas, Ont.
McIntosh, H. H., Montreal. Q.
McIntosh, James A., Vankleek Hill, Ont.
McLaren, Daniel D., Felton, Ont.
McLaughlin, Edmund M., Winona, Minn., U.S.A.
McPherson, Thos., B.A., Stratford, Ont.
Maby, William J., Cohoes, N.Y., U.S.A.
Magee, Charles F., North Gower, Ont.
Meindl, Alexander G., Mattawa, Ont.
Mitchell, Isaiah E., B.A., Sherbrooke, Q.
Montgomery, Charles H., St. John, N.B.
Morris, Samuel C., Wallace, N.S.
Moses, Harry C., Caledonia, Ont.
Munroe, Harrington B., B.A., Almonte, Ont.
Munroe, Hugh E., St. Elmo, Ont.
Munro, James H., Maxville, Ont.
Murray, James S., St. John, N.B.
Nelson, James S., Ottawa, Ont.
Nelson, William E., Montreal.
Ness, Wm. Howick, Q.
O'Brien, Clarence W., B.A., Noel, N.S.
O'Neill, James M., Massena, N.Y., U.S.A.
Park, Andrew W., Durham, Ont.
Parris, Norman D., Barbados, W.I.
Patch, Frank S., B.A., Montreal.
Pavey, Harry L., London, Ont.
Peterson, George R., Tay's Hill, Ont.
Puddington, Berton A., St. John, N.B.
Rehfuss, Wallace N., B.A., Bridgewater, N.S.
Robertson, William G., Westmount, Q.
Saunders, William Edward, Woodstock, N.B.
Scott, Walter, Montreal.
Secord, Wesley H., Brantford, Ont.
Shaw, David LeB., Portland, Me., U.S.A.
Slack, Malcolm R., Farnham, Q.
Smith, Charles M., Red Mountain, Q.

Steeves, Elmore O., Upper Sackville, N.B.
Stowell, Frank E., Worcester, Mass., U.S.A.
Strong, Norman W., B.A., Cambria, Q.
Symmes, Charles Ritchie, Aylmer, Q.
Taggart, Edmund A., Ottawa, Ont.
Tanner, Charles A. H., Windsor Mills, Q.
Thomas, Stanley B., Barbados, W.I.
Townsley, Robert H., Montreal.
Truax, Windsor, Farnham, Q.
Turner, George H., B.A., Baie Verte, N.B.
Warren, John G., Montreal.
White, Samuel G., Ottawa East, Ont.
Wilkins, Fred. F., Montreal.
Wilson, Arthur, Russell, Ont.

SPECIAL STUDENTS.

Disbrow, John R., M.D., Jacquet River, N.B.
Eitel, Adam J., M.D., Montreal.
Hutchinson, John W., Westmount, Q.

Faculty of Applied Science.

FIRST YEAR.

UNDERGRADUATES.

Anderson, Frederic W., Ottawa, Ont.
Baylis, Harold A., Montreal.
Beaudry, Abel C., Montreal.
Bell, George E., St. Thomas, Ont.
Benedict, Elmore M., Brantford, Ont.
Black, Douglas E., Montreal.
Blackader, Gordon H., Montreal.
Boyd, Alfred M. S., Westmount, Q.
Brady, James C., Victoria, B.C.
Brennan, George E., Ottawa, Ont.
Brown, William G. B., Quebec, Que.
Carlyle, Russell, Woodstock, Ont.
Conway, Edmund J., Chemainus, B.C.
Corrigan, Thomas L., Brockville, Ont.
Cowen, Reginald P., Dalston, Cumberland, England.
Daly, William J., Montreal.
Davidson, Thomas R., Montreal.
(2) *Dickenson, John G., Hazel Hill, N.S.
Durland, Royden K., Yarmouth, N.S.
Ewens, W. Sydney, Owen Sound, Ont.
Forbes, John McNeil, Bonavista, Newfoundland.
Frith, George H., Cummings' Bridge, Ont.
Gaunt, Reginald T., Montreal.
Greenshields, John G., Montreal.
Grier, Arthur H., Montreal.
Gurd, A. Douglas, Montreal.
Hadley, Harry, Montreal.
Harding, Winthrop K., Derby Line, Vt., U.S.A.
Harry, Archippus C., Kingston, Ja., B.W.I.
Harvie, James, Westmount, Q.
*Harvie, Robert, Westmount, Q.

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* *Double Course.*

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

Hibbard, Melville L., Farnham, Q.
(2) Hodgson, Cassels V., Montreal.
Howell, Edgar N., Westmount, Q.
Jackson, Maunsell B., Toronto, Ont.
(2) Jardine, Ernest I. W., Manitou, Man.
Jones, Andrew U., St. John, N.B.
Kirkpatrick, Everett C., Montreal West, Q.
Landry, A. Raymond, Dorchester, N.B.
Lea, William S., Victoria, P.E.I.
Lemoine, Louis, B.A., Montreal, Q.
Leonard, Albert P., Westmount, Q.
Lynch, Francis C. C., Carillon, Q.
Macdonald, Peter J., Winnipeg, Man.
McCuaig, G. Eric, Montreal.
McDonald, Harold F., Fort Qu'Appelle, Assa., N.W.T.
McLachlan, D. William, Lochaber Bay, Q.
McLachlin, Dan., Arnprior, Ont.
McMeekin, Albert, Bright, Ont.
Mudge, Reginald, Montreal.
Newton, Stephen G., Drummondville, Q.
Norton, Thomas J., B.A., Montreal.
Pedley, Norman F., Montreal.
Pickard, Herbert G., Exeter, Ont.
Pillow, Howard, Montreal.
Poupore, Leo, Montreal.
Presner, Joseph, Montreal.
Roger, Alec., Billings Bridge, Ont.
(2) Rolland, Robert, Montreal.
Ryan, Frederick G., St. Lambert, Q.
Scott, W. Gordon, Valleyfield, Q.
Sharp, Lester A., Summerside, P.E.I.
(2) Skelton, Henry M., Stoneycroft, Rosemere, Q.
Slavin, Reginald V., Deseronto, Ont.
Small, James D., Westmount, Q.
Steedman, William F., Montreal.
Taylor, Allan H., Ottawa, Ont.
Tupper, Frederick McD., Truro, N.S.
Turley, Edward J., Frankford, Ont.
Walker, Cecil W., Kensington, P.E.I.
Waterous, Logan M., Brantford, Ont.
Winter, Elliot E., Georgetown, British Guiana.
*Wickware, Francis G., Easton's Corners, Ont.

CONDITIONED STUDENTS.

Bellasis, Brian M., Montreal.
Burnett, Archibald, Montreal.
Cattanach, Frederick W. C., Newport, Vt., U.S.A.
Cole, L. Heber, Montreal.
(2) Dickson, Wallace, Montreal.
Harmer, C. Gerald, Toronto, Ont.
Graham, Wendell S., New Glasgow, N.S.
Hodge, William J. R., Capleton, Q.
Loudon, Andrew C., Ottawa, Ont.
Macdonald, R. Ross, Hamilton, Ont.
Mackay, Robert M., New Glasgow, N.S.
Mackay, George W., New Glasgow, N.S.
Mackinnon, Hugh D., Finch, Ont.

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* *Double Course.*

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

Prevost, Armand, Ottawa, Ont.
Robb, Roland W., Amherst, N.S.
Shorey, Harold E., Montreal.
Simard, Joseph W., Montreal.
Slater, Nicholas J., Ottawa, Ont.
Smith, Kenneth H., London, Ont.
Wilson, Starr R. L., Lunenburg, N.S.
Wheaton, Isaac, Sackville, N.B.

PARTIAL STUDENTS.

Browne, Robert Russell, Montreal.
Haskell, Ludlow St. J., Montreal.
Hassberger, James S., Westmount, Q.
Howe, John Parnell, Pembroke, Ont.
Johnson, R. Ernest, Montreal.
Lantier, Jean O., Montreal.
Mather, William A., Rat Portage, Ont.
(3) Morris, Hugh B., Dorval, Q.
Pease, Harold McK., Montreal.
Phillips, Thomas N., Rat Portage, Ont.
Richards, William A., Pembroke, Ont.
Wright, James V., Montreal.

SECOND YEAR.

UNDERGRADUATES.

Anderson, Lewis B., Lunenburg, N.S.
Archibald, Hiram H., Harbour Grace, Nfld.
Bain, James W. L., Montreal.
Baker, C. Stanley H., Hampstead, London, England.
Barclay, Charles H., St. Paul, Minn., U.S.A.
Batchelder, Charles K., Newport, Vt., U.S.A.
Belanger, Victor E. A., L'Orignal, Ont.
Blackadar, Thomas B., Hebron, Yarmouth, N.S.
Blanchet, Guy H., Ottawa.
Bowness, E. W., Kensington, P.E.I.
Boyle, Robert W., Carbonear, Nfld.
Bray, Raymond P., Campbellton, N.B.
Burpee, Lockwood, Gibson, N.B.
Campbell, John A., Cheltenham, Ont.
Churchill, Cecil A., Hantsport, N.S.
Cockshutt, Harvey W., Brantford, Ont.
Cropper, William C. McL., Kingstown, St. Vincent, W.I.
Cunha, S. H. Stanley, Kingston, Jamaica, W.I.
Dickson, George L. (M.A.), Truro, N.S.
Drinkwater, Kenneth E., Montreal.
Eadie, George H. H., Montreal.
Eaton, E. Courtlandt, Montreal.
Findlay, Delmer C., Danville, Q.
(3) Fraser, Donald MacI., Montreal.
Fraser, Thomas C., New Glasgow, N.S.
Fyshe, Thomas M., Montreal.
Gibbs, Harold E., Port Arthur, Ont.
Gillespie, William K., St. Stephen, N.B.
Gillis, Hugh B., Sydney, N.S.
Glassco, Gordon B., Hamilton, Ont.
(3) Hamilton, Alfred McL., Westmount, Q.

The figure (1), (2), (3) or (4), prefixed to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

(3) Hamilton, Wilfrid, Montreal.
*Harris, Alan D., Ottawa, Ont.
Higgins, Benjamin H., London, Ont
Hogan, John, Westmount, Q.
Idsardi, Harold, St. Thomas, Ont.
Jewett, F. Coburn, Sheffield, N.B.
Johnstone, George A., Rednersville, Ont.
Joseph, A. Pinto, Quebec. Q.
Jost, Edward B., Guysboro, N.S.
Kydd, George, Montreal.
Livingston, Douglas C., Corfield, B.C.
Lockerby, Robert A., Montreal.
MacDermot, Sidney G. F., Gordon Town, Jamaica, W.I.
MacMillan, Henry H., Alberry Plains, P.E.I.
Macnab, John J., Elsinore, Bruce Co., Ont.
(3) Martin, Edward N., York, Ont.
McIntosh, Robert, Newcastle, Ont.
McLean, Donald, B.A., Campbellton, N.B.
McLeish, Ian, Montreal.
Miner, R. Herbert, Cowansville, Q.
Mooney, Chester A., Ausable Chasm, N.Y., U.S.A.
(3) Mundy, Oswald A., Hamilton, Ont.
Pattison, Albert M., Clarenceville, Q.
(3) Piché, Ernest A., Montreal.
(3) Price, Herbert L., Montmorency Falls, Q.
Pinch, Harry H., Owen Sound, Ont.
Redpath, William, Montreal.
Ritchie, A. Bruce, Halifax, N.S.
Robertson, Arthur F., Montreal.
Robitaille, Henry, Quebec, Q.
Ross, Walter G., Port Perry, Ont.
Ryan, John H., Prescott, Ont.
Scouler, Gavin T., New Westminster, B.C.
Sharpe, George P., Agassiz, B.C.
Shaughnessy, William J., Montreal.
Small, Edward A., Montreal.
Smith, Ralph E., Windsor, N.S.
Sutherland, Charles, New Glasgow, N.S.
Sutherland, Daniel H., River John, N.S.
Turnbull, Harvard, Montreal.
Weagant, Roy A., Derby Line, Vt., U.S.A.
Wheaton, Hazen A., Elgin, Albert Co., N.B.
Willard, Charlie, Morrisburg, Ont.
Wright, Clifton H., Barbadoes, W.I.
Young, Horace G., Oznabruck, Ont.

PARTIAL STUDENTS.

Eve, A. S., B.A., Cambridge, Eng.
Irving, Thomas C., Toronto, Ont.
Rheaume, Herman C., Montreal.

THIRD YEAR.

UNDERGRADUATES.

Atkinson, M. Brodie, Montreal.
Blumenthal, Samuel, Montreal.
Cameron, John A., Toronto, Ont.

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* *Double Course.*

The figure (1), (2), (3) or (4), preflexd to a name, indicates that the student takes a class in the corresponding year as well as in that where the name is found.

Campbell, Colin St. G., Aldershott, Ont.
Cardew, John H., Youngs Point, South Beach, Q.
Carlyle, Ernest J., Woodstock, Ont.
Chambers, Robert A., Montreal.
Chaplin, Charles J., Westmount, Q.
Cole, George H., Ottawa, Ont.
Crichton, Gordon L., Halifax, N.S.
Davis, Patrick, Windsor, Ont.
Dawe, Robert G., Bay Roberts, Nfld.
Devlin, Cecil G., Mohawk, Ont.
Deyell, Harold T., Port Hope, Ont.
Drysdale, William F., Montreal.
Dutcher, Howard K., Charlottetown, P.E.I.
Ells, Sidney G. (B.A.), Ottawa, Ont.
Gillies, George A., Carleton Place, Ont.
Gnaedinger, Ernest C., Montreal.
Greey, John W. G., Toronto, Ont.
Grice, J. H., Bootle, Cumberland, Eng.
Harvey, John B., Lyndhurst, Ont.
Healy, Frederick E., Picton, Ont.
Johnson, Frederick M. G., Montreal.
Kemp, Robert A., Seaforth, Ont.
Kent, George M., Truro, N.S.
Lambart, Howard F., Ottawa, Ont.
Lawrence, William D., Maitland, N.S.
LeMaistre, Frederick J., Westmount, Q.
MacNaughton, W. G., B.A., Huntingdon, Q.
Marrotte, Louis H., Westmount, Q.
McCloskey, Frederick W., Boiestown, N.B.
McDougall, Clarence H., South Maitland, N.S.
McDougall, George K., Montreal.
McPhee, James C., Loch Katrine, Ant. Co., N.S.
McMurtry, Gordon O., B.A., Montreal.
Parlee, Norman W., Rossland, B.C.
Roffey, Miles H., Braintree, Essex, Eng.
Scott, George W., Montreal.
Sullivan, Michael H., Ottawa, Ont.
Taylor, Reginald F., Gananoque, Ont.
Webster, George B., Montreal.
Wenger, John A., Ayton, Ont.
Wilkes, Frederick C. D., Brantford, Ont.
Wilson, William D., Hamilton, Ont.
Wurtele, John S. H., Acton Vale, Q.

PARTIAL STUDENTS.

Robinson, Harold G., Bristol, Eng.
Robinson, Kenneth S., Bristol, Eng.
Spencer, Arthur G., B.A., Truro, N.S.

FOURTH YEAR.

Baker, William E., Montreal.
Beck, Alfred E., Penetanguishene, Ont.
Blatch, Harry E., St. John's, Nfld.
Boright, Sherman H., Sutton, Q.
Brown, Frederick B., Montreal.
Cohen, Harris, Montreal.
Cole, G. Percy, Montreal.
Conklin, Roscoe, M.A., Winnipeg, Man.
Crawford, Stuart, Montreal.
Cumming, Rutherford, Scotsburn, Pictou Co., N.S.

Edgar, John H., Montreal.
Egleson, James E. A., Ottawa, Ont.
Foreman, Alvah E., Vancouver, B.C.
Gale, George G., Quebec, Q.
Hall, Oliver, Washington, Ont.
Haskin, Laurence S. (M.E.), Waterford, Conn., U.S.A.
James, Bertram, Heart's Content, Nfld.
Jones, Harold W., Ottawa, Ont.
Keith, Fraser S., Smith's Falls, Ont.
Kendall, George, Vancouver, B.C.
Landry, Pierre A. (B.A.), Dorchester, N.B.
Langley, Albert G., Victoria, B.C.
Lucas, Allen S. B. (B.A.). Hamilton, Ont.
Maclaren, Francis F., Huntingdon, Q.
McCaskill, Kenneth, Vankleek Hill, Ont.
McDonald, James F., Westville, N.S.
McKay, Frederick A., Montreal.
McKergow, Charles M., Westmount, Q.
Millar, James L., Pembroke, Ont.
Musgrave, Robert, Duncans, B.C.
Musgrave, William N., Duncans, B.C.
Pemberton, William P. D., Gonzales, Vancouver, B.C.
Porcheron ,Alphonse, Montreal.
Reynolds, Leo B., Waterford, Ont.
Roberts, Arthur R., Montreal.
Robertson, John F., Charlottetown, P.E.I.
Rodger, Herbert F., St. John's Nfld.
Ross, James C., Embro, Ont.
Rowlands, Charles, Albany, N.Y., U.S.A.
Rowley, Lorne E., M.A., Marysville, N.B.
Savage, George M..Montreal.
Stokes, Chas. W., Woodstock, N.B.
Stovel, Joseph H., Toronto, Ont.
Thorpe, William H., Montreal.
Tilt, Edwin B., Goderich, Ont.
Trimingham, Charles L., Barbadoes, W.I.

Faculty of Comparative Medicine.

FIRST YEAR.

Barnett, E., Montreal.
Cawsey, H., Halifax, N.S.
Gale, E., Quebec, Q.
Grignon, R., St. Adèle, Q.
Maguire, F. H., Waterloo, Q.
Miller, W., Rouse's Point, N.Y., U.S.A.
Morgan, H., Montreal.
Moriarity, Ed., East Hampton, Conn., U.S.A.
Morris, A. S., Jersey City, New Jersey, U.S.A.
Thurston, S., Sydney, C.B.

SECOND YEAR.

Carroll, F. F., Boston, Mass., U.S.A.
Gauvin, N., Quebec, Q.
Gray, F., Antigonish, N.S.
Meakings, E. A., Montreal.
Stoute, C. P., Belleville, Barbados, W.I.

THIRD YEAR.

Gaw, Hugh, Clinton, Mass., U.S.A.
Halcro, Geo., Hudson, Q.
Henderson, C. M., Vancouver, B.C.
Littlehales, J. E., Montreal.
Paterson, H., Montreal.

COLLEGES ASSOCIATED IN ARTS.

Stanstead Wesleyan College.

FIRST YEAR.

UNDERGRADUATES.

Cass, Frank O.
Flanders, Arlington.
Edwards, William.
Williams, C. Louise.

CONDITIONED STUDENTS.

Phelps, M. Gertrude.
Stanton, R. Gertrude.

PARTIAL STUDENT.

Stanton, M. Charlotte.

Vancouver College.

FIRST YEAR.

UNDERGRADUATES.

Anstie, Jennie.
Brydone, Jack F. W.
Davidson, Gwladys D.
Foreman, Nina B.
Langley, Celia G.
Loat, Kathleen B.
McLean, Margaret.
McPhalen, Mary M.
McQueen, Kate H.
McTaggart, Donald E.
Smith, Arthur N.
Stewart-Hamilton, Evelyn R.

CONDITIONED STUDENTS.

Bethune, Katherine.
Copeland, Lydia B.
Ellis, Robert W.

SECOND YEAR.

UNDERGRADUATES.

Bajus, William P.
DePeck, Edwin K.
Donaldson, William A.
Milne, Helen B.
Price, Thomas E.

SPECIAL STUDENT.

Laverock, Lily J.

1902-03

Summary.

Students in Law		40
" " Arts, McGill College:—		
Men—Graduates	2	
Undergraduates	122	
Conditioned	12	
Partial	40	
Women—Graduates	5	
Undergraduates	61	
Conditioned	6	
Partial	80	
Students in Arts, Vancouver College	21	
" " " Stanstead College	7	
		356
Students in Medicine		420
Students in Applied Science		
Undergraduates	241	
Conditioned	21	
Partial	18	
		280
Students in Veterinary Science		20
		1116
Deduct repeated in different Faculties		18
Total		1098

University and Graduates' Societies.

McGill Physical Society.

President—Prof. E. Rutherford.
Vice-President—Prof. J. Cox.
Rec. Secretary—Dr. H. T. Barnes.
Asst. Rec. Secretary—H. Lester Cooke, B.A.
Executive Committee—Dr. J. Wallace Walker, Dr. A. Stansfield, Dr. Coker.

Undergraduates' Literary Society.

CONSTITUTED 1880.

Hon. President—Principal Peterson.
President—E. McGougan, Arts, '04.
1st Vice-President—A. D. McKenzie, Arts, '04.
2nd Vice-President—C. Adams, Arts, '05.
Secretary—L. P. Edwards, Arts, '05.
Treasurer—J. C. Nicholson, Arts, '05.
Committee—W. S. Johnson, Arts, '03 ; G. C. Couture, Arts, '03 ; J. DeWitt, Law, '05; W. L. Carr, Arts, '05; T. M. Papineau, Arts, '04.
Reporters—A. W. Cameron, Arts, '05; R. P. Wallace, Law, '06.

Delta Sigma Society.

ESTABLISHED 1884.

President—Ada Dickson.
Vice-President—Rosebud Michaels.
Secretary-Treasurer—Mabele Rorke.
Committee—Catherine Mackenzie, Marion Taber, Clarissa Blakemore.

McGill Historical Club.

President—Talbot M. Papineau, Arts, '04.
Vice-President—Grant D. Campbell, Arts, '04.
Secretary—Gordon Brown, Arts, '04.
Treasurer—L. P. Edwards, Arts, '05.
Executive Committee—Prof. C. W. Colby, M.A., Ph.D. ; W. J. Healy, Arts, '04 ; O. B. McCallum, Arts, '05.
Reporter—E. W. Sheldon, Arts, '04.

McGill Applied Science Society.

(Officers, 1902.)

Hon. President—Dr. H. T. Bovey.
President—H. P. Borden, Civ. Eng., '02.
Vice-Presidents—C. M. Campbell, Mining Engineering, '02; T. W. Hicks, Mechanical Engineering, '02; J. H. Edgar, Mech. Eng., '02.
Secretary—J. G. Ross, '03.
Treasurer—O. Hall, '03.
2nd Year Representatives—E. J. Carlyle, '04; G. O. McMurtry, B.A., '04; J. J. McNab, '05.
Reporters—C. Rowlands, '03; J. E. A. Egleson, '03; F. E. Sterns, '02; H. Biggar, '02.

The McGill Mining Society.

ORGANIZED 1891.

Hon. President—Dr. J. B. Harrington.
President—Robert A. Chambers, App. Sci., '04.
Vice-President—W. Parker, App. Sci., '05.
Secretary-Treasurer—D. C. Livingstone, App. Sci., '05.

McGill University Chemical Society.

President—B. J. Harrington, M.A., LL.D.
Vice-President—R. F. Ruttan, B.A., M.D.
Secretary-Treasurer—N. N. Evans, M.Sc.
Executive Committee—B. J. Harrington, M.A., LL.D.; R. F. Ruttan, B.A., M.D.; J. Wallace Walker, M.A., Ph.D.; H. T. Barnes, D.Sc.; N. N. Evans, M.Sc.

McGill Medical Society.

Hon. President—Dr. F. W. Hamilton.
President—V. L. Miller, B.A.
Vice-President—J. Appleton Nutter, B.A.
Secretary—Alison Cumming, B.A.
Assist. Secretary—H. H. Christie.
Pathologist—L. L. Harrison, B.A.
Treasurer—F. J. Tees, B.A.
Reporter—A. C. Sellery.
Councillors—Dr. Shepherd, Dr. Mills, W. J. Patterson, B.A.

Young Men's Christian Association of McGill University.

OBJECT—To promote the Christian character of its members and the cause of Christianity in the University.

MEMBERSHIP—The active membership of the Association consists of graduates and students of the University who are members of some evangelical church. Any graduate and student of good moral character may become an associate member. A social reception is given to new students at the beginning of the session.

Full particulars regarding regular religious services and Bible Study Classes are given in the Hand Book of the Association.

Hon. President—Alex. Johnson, M.A., LL.D., D.C.L.
President—G. H. Cole, Sci., '04.
1st Vice-President—A. D. Mackenzie, Arts, '04.
2nd Vice-President—L. C. Lauchland, Med., '04.
Rec. Secretary—W. G. MacNaughton, B.A., Sci., '04.
Treasurer—S. O. McMurtry, B.A., Med., '05.
Asst.-Treasurer—E. M. Benedict, Sci., '06.
Representative from Law—W. U. Cotton, B.A.
General Secretary—George Irving, B.A.

CHAIRMEN OF COMMITTEES.

Religious Meetings—A. D. Mackenzie, Arts, '04.
Bible Study—E. W. Sheldon, Arts, '04.
Social—D. E. Black, Sci., '06.
Membership—W. J. Paterson, B.A., Med., '06.
New Students and Handbook—General Secretary.
Bulletin and Reading Room—R. A. Kemp, Sci., '04'.

Missionary—F. J. LeMaistre, Sci., '04.
Musical—V. L. Miller, B.A., Med., '04.
Building—G. H. Cole, Sci., '04.
Finance—S. O. McMurtry, B.A., Med., '05.
City Missions—John A. McDonald, B.A., Med., '05.
New Students—George Irving, B.A.

Young Women's Christian Association.

ESTABLISHED 1887 (AS THEO DORA SOCIETY).

OBJECT.—The development of Christian character in the members, and the development of active Christian work, particularly among the young women of the University. Open for membership to students of the Royal Victoria College for Women.

President—Ivy Gardner.
Vice-President—Nora Bowman.
Rec. Secretary—Mabel Fraser.
Cor. Secretary—Kathleen McCally.
Treasurer—Birdena Clark.

McGill University Athletic Association.

ESTABLISHED 1884.

Hon. President—R. Tait MacKenzie, B.A., M.D.
Hon. Treasurer—Prof. C. H. McLeod, Ma.E.
President—G. M. Kent, Sci., '04.
Vice-President—W. P. Ogilvie, Law, '04.
Treasurer—W. Stewart, Arts, '05.
Secretary—R. O. McMurtry, Arts, '05.
Representatives:—Law—E. McDougall, '04; Arts—T. M. Papineau, '04; Medicine—R. N. W. Shillington, '04; Science—E. N. Martin, '04; Football—L. L. Reford, B.A., Med., '04; Cricket—Prof. C. E. Moyse; Skating and Hockey—S. H. Maclaren, Science, '03; Basketball—A. E. Foreman, Science, '03; Tennis—R. N. Hickson, B.A.

McGill University Football Club.

Hon. President—Dr. W. Turner.
Hon. Treasurer—Dr. R. Tait MacKenzie.
President—Lewis L. Reford, B.A., Med., '04.
Vice-President—S. M. Nagle, Med., '04.
Secretary—W. Wilson, Sci., '04
Treasurer—E. N. Martin, Sci., '04.
Manager—Gordon Gibson, Med., '04.
Committee :—Arts—W. Molson, '04 ; T. M. Papineau, '04 ; Medicine—G. A. Wright, '04 ; P. C. Crosby, '04 ; Science— — Hamilton, '04 ; J. McPhee, '04.

McGill University Association Football Club.

Hon. President—Prof. McLeod.
President—R. W. Boyle, Sci., '05.
Vice-President— —— Richards.
Secretary—A. McMeekin, Sci., '05.
Treasurer—E. McGougan, Arts, '04.
Committee—Max Fyshe, Science, '05; J. M. Forbes, Science, '06; J. E. Featherston, Arts, '05.

McGill University Cricket Club.

Hon. Presidents—Lord Strathcona and Mount Royal, Principal Peterson
President—Prof. C E. Moyse.
Vice-President—A. R. Oughtred, B.C.L.
Secretary-Treasurer—W. C. Baber.
Assist. Secretary—J. J. Lomax.
Captain—W. W. Walker.
Captain Second Eleven—W. Robinson.
Committee—H. C. Hill, F. W. Hibbard, F. L. Gunter, S. B. Thomas, W. Robinson.

McGill Lawn Tennis Club.

Hon. President—Mr. H. M. Jaquays.
President—J. D. G. McCallum.
Vice-President—T. M. Fyshe.
Secretary—G. C. McDonald.
Treasurer—W. Molson.
Committee :—Graduates—P. Molson, ; Arts :—J. G. Dickenson ; Science—G. M. Savage ; Medicine—D. P. Hannington ; Law—H. S. Williams.

McGill University Skating and Hockey Club.

Hon. President—Prof. S. H. Capper.
President—J. H. Maclaren, Sci., '03.
Vice-President—G. McDonald, Arts, '04.
Secretary—L. S. Mackid, Med., '04.
Treasurer—K. Drinkwater, Sci., '05.
Committee:—Law—C. G. Mackinnon, '03; W. P. Ogilvie, '04; S. Dale Harris, '05; Medicine—K. Blair, '03; H. O. Howitt, '04; C. Young, '05; E. A. Lindsay, '06; Arts—A. Dunlop, '03; F. Gurd, '04; R. O. McMurtry, '05; F. A. Patrick, '06; Science—G. G. Gale, '03; E. G. Gnaedinger, '04 ; R. A. Lockerby, '05 ; F. G. Wickware, '06.

McGill Basket Ball Club.

Hon. President—Dr. R. Tait McKenzie.
President—A. E. Forman, Sci.
Vice-President—D. Ross, Arts.
Secretary-Treasurer—A. McKergow, Sci.
Captain—B. H. Higgins, Sci.
Member of Executive Committee:—G. M. Gibson, Med.

R. V. C. Athletic Club.

President—Catherine McKenzie.
Vice-President—Ruth Lyman.
Secretary-Treasurer—Ruth Holway.
Manager of Basketball Club—Kathleen McCally.
Manager of Hockey Club—Helen Freeze.

McGill Glee and Banjo Club.

Hon. President—T. G. Roddick, M.D., LL.D.
President—F. C. Douglas, Med., '03.
Vice-President—R. A. Chambers, Sci., '04.
Business Manager—W. H. Dickson, Med., '03.
Secretary—F. B. Brown, Sci., '03.
Executive Committee—A. B. Silcox, Arts, '06; Hal. White, Med., '06; S. C. Ells, Sci., '04.

Graduates' Society of McGill University.

(Officers, 1901.)

INCORPORATED 24TH JULY, 1880.

President—Malcolm C. Baker, D.V.S.
Vice-Presidents—Charles W. Wilson, M.D.; Miss Helen R. Y. Reid, B.A.; Archibald MacArthur, B.A.
Secretary—J. Claud Hickson, B.A., B.C.L.
Treasurer—Francis Topp, B.A., B.C.L.
Resident Councillors—A. Rives Hall, B.A., B.C.L.; Frank D. Adams, M.A., Ph.D. ; Homer M. Jaquays, M.A.Sc. ; E. Fabre Surveyor, B.A., B.C.L.; Howard M. Church, M.D.; W. F. Angus, B.A.Sc.
Non-Resident Councillors—The Presidents of the British Columbia Graduates' Society, the New England Graduates' Society, the New York Graduates' Society, the Maritime Graduates' Society, and the Hon. W .W. Lynch, D.C.L,. Knowlton, Que.

Alumnæ Society of McGill University.

President—K. Campbell, B.A.
Vice-Presidents—S. E. Cameron, M.A.; G. Hunter, B.A.; Jane V. Palmer, B.A.; Eleanor Tatley, B.A.
Treasurer—M. Watson, B.A.
Assist. Treasurer—J. Eva Warriner, B.A.
Rec. Secretary—Vivian E. Clogg, B.A.
Assist. Rec. Secretary—Annie W. Nolan, B.A.
Cor. Secretary—E. A. Hammond, M.A.
Assist. Cor. Secretary—E. Armstrong, B.A.

Ottawa Valley Graduates' Society of McGill University.

ORGANIZED 1890.

Hon. President—The Right Hon. Sir Wilfrid Laurier, P.C., K.C.M.G., LL.D.
President—H. M. Ami, LL.D.
Vice-Presidents—G. H. Groves, M.D. (Carp.); G. C. Wright, B.A., B.C.L.; Rev. N. A. McLeod, B.A.
Secretary—J. F. Argue, M.D. (127 Bank St., Ottawa.)
Treasurer—W. Gamble, B.A., B.C.L.
Council—S. P. Cook, M.D.; R. W. Ells, M.A., LL.D.; D. B. Dowling, B.A.Sc.; A. W. Duclos, B.A., B.C.L.; J. A. Robert, B.A.Sc.

New York Graduates' Society of McGill University.

President—Wolfred Nelson, M.D., C.M., F.R.G.S.
1st Vice-President—James Albert Meek, M.D., C.M.
2nd Vice-President—Hiram N. Vineberg, M.D., C.M.
3rd Vice-President—Harcourt Bull, B.A.
Treasurer—M. Casewell Heine, B.A.
Secretary—R. A. Gunn, B.A.Sc. 45-47 Wall St., New York).
Chaplain—Rev. J. J. Rowan Spong, M.A., B.C.L., LL.B.
Executive Committee—James Douglas, B.A., LL.D.; J. B. Harvie, M.D., C.M., Troy, N.Y.; George H. Frost, C.E.
Non-Resident Councillors—Wm. Osler, M.D., C.M., F.R.C.P. (Lond.), F.R.S. (Baltimore, Md.); Prof. the Rev. J. C. Bracq, M.A., Vassar College, N.Y.; The Right Rev. J. D. Morrison, M.A., D.D., Bishop of Duluth; R. T. Irvine, M.D., C.M., Ossining, N.Y.; James J. O'Dea, M.D., C.M., Stapleton, Staten Island ; H. Holton Wood, B.A., Boston, Mass.

New England Society of McGill Graduates.

President—Arthur E. Childs, M.Sc. (Boston, Mass.).
1st Vice-President—George A. Fagan, M.D. (North Adams, Mass.).
2nd Vice-President—Ambrose Choquet, B.C.L. (Central Falls, R.I.).
3rd Vice-President—H. Holton Wood, B.A. (Boston, Mass.).
Secretary-Treasurer—Joseph Williams, M.D. (Boston, Mass.; 45 Monument Square).
Councillors—T. G. McGannon, M.D. (Lowell, Mass.); Miles Martin, M.D. (Boston, Mass.); W. W. Goodwin, M.D. (East Boston, Mass.); R. T. Glendenning, M.D. (Manchester-by-the-Sea, Mass.); Joseph C. Pothier, M.D. (New Bedford, Mass.); J. G. Pfersick, D.V.S. (Shelburn Falls, Mass.).

McGill Graduates' Society of the District of Bedford.

ORGANIZED 1898.

Hon. President—Hon. W. W. Lynch, D.C.L. (Knowlton).
President—R. T. Macdonald, M.D. (Sutton).
Vice-Presidents—D. Stevens, M.D. (Missisquoi); M. N. Harris, M.D. (Brome); Charles McBurney, B.A. (Shefford).
Secretary-Treasurer—

The British Columbia Society of Graduates of McGill University.

President—D. H. Harrison, M.D. (Vancouver).
Vice-Presidents—G. H. Manchester, M.D. (New Westminster); J. M. McGregor, B.A., B.A.Sc. (Slocan City); A. R. Raymond, M.D. (Seattle, Wash.); Rosalind Watson, M.A. (Victoria); Walter Hunter, B.A., B.C.L. (Nanaimo); J. S. Gordon, B.A. (Vernon).
Secretary—W. J. McGuigan, M.D., LL.B. (Vancouver).
Treasurer—Simon J. Tunstall, B.A., M.D. (Vancouver).
Executive Committee—W. A. Bennett, M.D. (Vancouver); R. W. Suter, B.A., B.Sc. (Vancouver); J. B. Hart, D.V.S. (Vancouver); G. W. Boggs, M.D. (New Westminster); A. D. Taylor, B.A., B.C.L. (Vancouver); D. B. Holden, B.A., M.D. (Victoria).

McGill University Alumni Association of Chicago.

ORGANIZED 1900.

President—H. J. Burwash, M.D.
1st Vice-President—Chester B. Reid, B.A.Sc.
2nd Vice-President—John Ryan, M.D.
Secretary-Treasurer—Thomas A. Woodruff, M.D.
Councillors—Kenneth Moodie, B.A.Sc.; D. R. MacMartin, M.D.; J. Brown Loring, M.D.

McGill Graduates' Society of Toronto.

(Officers, 1902.)

ORGANIZED 1896.

President—A. R. Lewis, K.C.
1st Vice-President—Rev. Canon Sweeny, M.A., D.D.
2nd Vice-President—H. C. Burritt, M.D.
Secretary-Treasurer—R. B. Henderson, B.A., 48 King Street, West.
Committee—Hamilton Cassels, B.A.; Willis Chipman, B.A.Sc.; P. E. Ritchie, B.A.

Maritime Graduates' Society of McGill University.

(Officers, 1902.)

Hon. President—John McMillan, M.D. (Pictou, N.S.).
President—Alex. McNeil, M.D. (Kensington, P.E.I.).
Vice-Presidents—J. H. Scammell, M.D. (St. John, N.B.); Henry S. D. Johnson, M.D. (Charlottetown, P.E.I.); J. G. Macdougall, M.D. (Amherst, N.S.).
Secretary-Treasurer—F. A. Corbett, M.D. (Parrsboro, N.S.).
Executive Committee—Geo. Carruthers, M.D. (Charlottetown, P.E.I.); Jas. A. Johnson, M.D. (Emerald, P.E.I.); G. A. B. Addy, M.D. (St. John, N.B.); J. B. Travers, M.D. (St. John, N.B.); J. J. Doyle, M.D. (Halifax, N.S.); H. H. Mackay, M.D. (New Glasgow, N.S.).

Benefactors of McGill University, Montreal.

I. General Endowments and Subscriptions.

1. Original Endowment, 1811.

THE HONORABLE JAMES McGILL, who was born at Glasgow, 6th Oct., 1744, and died at Montreal, 19th Dec., 1813, by his last will and testament, under date 8th of January, 1811, devised the estate of Burnside, situated near the city of Montreal, and containing forty-seven acres of land, with the Manor House and Buildings thereon erected, and also bequeathed the sum of ten thousand pounds in money unto the "Royal Institution for the Advancement of Learning," a Corporation constituted in virtue of an Act of Parliament passed in the Forty-first Year of the Reign of His Majesty, King George the Third, to erect and establish a University or College, for the purpose of Education and the advancement of learning, in the Province of Lower Canada, with a competent number of professors and teachers to render such Establishment effectual and beneficial for the purposes intended; requiring that one of the colleges to be comprised in the said University should be named and perpetually be known and distinguished by the appellation of "McGill College."

The value of the above mentioned property was estimated at the date of the bequest at..... ....$120,000

2. University Buildings, Etc.

THE WILLIAM MOLSON HALL, being the west wing of McGill College Buildings, with the connecting Corridors and Class Rooms, was erected in 1861, through the munificent donation of the founder, whose name it bears.

THE PETER REDPATH MUSEUM, the gift of the donor whose name it bears, was announced by him as a donation to the University in 1880, and formally opened August, 1882.

Lots for University buildings adjoining the College grounds confronting on McTavish St., presented by J. H. R. Molson, Esq.,—$42,500.

THE UNIVERSITY LIBRARY BUILDING, the gift of Peter Redpath, Esq., announced by him as a gift to the University in 1891, and formally opened October 31st, 1893. Enlarged by Mrs. Peter Redpath in 1900.

UNIVERSITY OFFICES, Rooms in East Wing, remodelled and furnished for offices of Principal and Secretary and for a Board Room, by Sir Wm. C. Macdonald, in 1895.

3. Endowed Chairs, Etc.

THE JOHN FROTHINGHAM PRINCIPAL FUND, to be invested for the endowment of the Principalship of the University; founded in 1889 by the Rev. Frederick Frothingham and Mrs. J. H. R. Molson,—$40,000.

THE MACDONALD AUXILIARY FUND, founded in 1897 by Sir Wm. C. Macdonald, the interest to be used solely to maintain the income of certain of his endowments on a five per cent. per annum basis, —$361,250.

4. Endowments and Donations of Medals and Prizes.

1883, a Gold, a Silver and a Bronze Medal were given by R. J. Wicksteed, Esq., M.A., LL.D., for competition in "Physical Culture," by students in the Graduating Class and second year of any Faculty, who have attended the University Gymnasium. The Gold Medal was continued to 1889, and the Silver and Bronze have been continued to date.

Ottawa Valley Graduates' Society's Exhibition. For competition by candidates from the Ottawa Valley at the June matriculation examinations of any Faculty. Value, $50.00. Given annually, 1895 to date.

A Prize given by the British Columbia Society of Graduates of McGill University to be divided amongst the five Faculties. Annual value $50.00 Given annually, 1896 to 1898.

5. Subscriptions to General Endowment.

John Frothingham, Esq.	$2000
John Torrance, Esq.	2000
James B. Greenshields, Esq.	1200
Wm. Busby Lambe, Esq.	1200
Sir George Simpson, Knight.	1000
Henry Thomas, Esq.	1000
John Redpath, Esq.	1000
James McDougall, Esq.	1000
James Torrance, Esq.	1000
Hon. James Ferrier	1000
Harrison Stephens, Esq.	800
Henry Chapman, Esq.	600
Hon. Peter McGill.	600
John James Day, Esq.	600
Thos. Brown Anderson, Esq.	600
Peter Redpath, Esq.	600
Thomas M. Taylor, Esq.	600
Joseph Mackay, Esq.	600
Donald Lorn McDougall, Esq.	600
Hon. Sir John Rose	600
Charles Alexander, Esq.	600
Forward	$19,200

Forward	$19,200
Moses E. David, Esq.	600
Wm. Carter, Esq.	600
Thomas Patton, Esq.	600
Wm. Workman, Esq.	600
Hon. Luther H. Holton.	600
Henry Lyman, Esq.	600
David Torrance, Esq.	600
Edwin Atwater, Esq.	600
Theodore Hart, Esq.	600
Wm. Forsyth Grant, Esq.	600
Robert Campbell, Esq.	600
Alfred Savage, Esq.	600
James Ferrier, jun., Esq.	600
Wm. Stephen, Esq.	600
N. S. Whitney, Esq.	600
William Dow, Esq.	600
William Watson, Esq.	600
Edward and Alicia Major	600
Hon. Sir A. T. Galt	360
John R. Esdaile, Esq.	200
Total	$30,560

1871.

John Frothingham, Esq.	$5150
William Molson, Esq.	5000
Sir William C. Macdonald.	5000
Thomas Workman, Esq.	5000
J. H. R. Molson, Esq.	2000
John McLennan, Esq.	1000
B. Gibb, Esq.	600
Messrs. A. & W. Robertson.	600
Forward	$24,350

Forward	$24,350
T. W. Ritchie, Esq.	300
Messrs. Sinclair, Jack & Co.	250
John Reddy, M.D.	100
Wm. Lunn, Esq.	100
Hon. F. W. Torrance.	60
Wm. Rose, Esq.	50
Total	$25,210

1881-82.

Hugh McLennan, Esq.	$5000
Hon. G. A. Drummond	4000
George Hague, Esq.	3000
M. H. Gault, Esq.	2000
Andrew Robertson, Esq.	1000
Robertson Campbell, Esq.	1000
Sir Jos. and Lady Hickson.	1000
Mrs. Andrew Dow.	1000
Alexander Murray, Esq.	1000
Miss Orkney.	1000
Hector McKenzie, Esq.	1000
Forward	$21,000

Forward	$21,000
O. S. Wood, Esq.	1000
J. B. Greenshields, Esq. (London)	1000
Warden King, Esq.	1000
W. P. Cumming, Esq.	1000
Mrs. Hew Ramsay	500
R. A. Ramsay, Esq.	500
H. H. Wood, Esq.	500
James Burnett, Esq.	500
Charles Gibb, Esq.	500
J. S. McLachlan, Esq.	200
Total	$27,700

1883-84.

Edward Mackay, Esq.....$5,000.

6. Endowment Fund for General Purposes.

1897.

Bequest of the late John H. R. Molson, Esq., $100,000.

7. Subscription for Improvements to College 1856

Hon. Charles Dewey Day .....$200.

8. Subscriptions for Current Expenses, 1881-82.

Principal Dawson					$1000
J. H. R. Molson	$1000	per annum,	5	years, being	5000
Lord Mountstephen	1000	"	"	"	5000
Lord Strathcona and Mount Royal	1000	"	"	"	5000
David Morrice, Esq	200	"	"	"	1000
Messrs. Gault Brothers & Co	200	"	"	"	1000
Messrs. S. H. & A. S. Ewing	200	"	"	"	1000
Hon. Robert MacKay	300	"	2 "	"	600
Jonathan Hodgson, Esq	100	"	5 "	"	500
Geo M. Kinghorn, Esq	100	"	5 "	"	500
David J. Greenshields, Esq					300
Thomas Craig, Esq	100	"	2 "	"	200
John Rankin, Esq					200
John Duncan, Esq					200
George Brush, Esq., $25 for five years, being					125
Robert Benny, Esq					100
Miss E. A. Ramsay					100
Hugh Paton, Esq., $50 for two years, being					100
J. M. Douglas, Esq					50
James Court, Esq					50
Total					$22,025

1887-88.

John H. R. Molson, Esq	$1000	per annum,	3	years, being	$3000
Sir Wm. C. Macdonald	1000	"	"	"	3000
Peter Redpath, Esq	1000	"	"	"	3000
Lord Strathcona and Mount Royal	1000	"	"	"	3000
Hon. James Ferrier	500	"	"	"	1500
Sir Joseph Hickson	500	"	"	"	1500
Hugh McLennan, Esq	250	"	"	"	750
E. B. Greenshields, Esq	250	"	"	"	750
George Hague, Esq	250	"	"	"	750
John Molson, Esq	250	"	"	"	750
Samuel Finley, Esq	250	"	"	"	750
Mrs. Mackay, $100 annually, 1889 to 1893					500
Total					$19,250

9. Subscription by Members of Board of Governors, in

1898-99.—$191,000.

10. Subscriptions for a Building for the Carpenter Collection of Shells.

1868.

Peter Redpath, Esq.	$ 500	Forward	$1,600
William Molson, Esq.	500	Geo. H. Frothingham, Esq.	100
Harrison Stephens, Esq.	100	Wm. Dow, Esq.	100
Robert J. Reekie, Esq.	100	Thomas Rimmer, Esq.	100
John H. R. Molson, Esq.	100	Andrew Robertson, Esq.	100
Sir Wm. E. Logan, F.R.S.	100	Mrs. Redpath	100
John Molson, Esq.	100	Benaiah Gibb, Esq.	50
Thos. Workman, Esq., M.P.	100	Hon. John Rose	50
Forward	$1,600	Total	$2,200

11. Subscriptions for the Erection of the Lodge and Gates.

William Molson, Esq.	$ 100	Forward	$1,100
John H. R. Molson, Esq.	100	John Frothingham, Esq.	100
William Workman, Esq.	100	James A. Mathewson, Esq.	100
Joseph Tiffin, jun., Esq.	100	Peter Redpath, Esq.	100
Thos. J. Claxton, Esq.	100	G. H. Frothingham, Esq.	100
James Linton, Esq.	100	G. D. Ferrier, Esq.	100
William McDougall, Esq.	100	John Smith, Esq.	100
Charles J. Brydges, Esq.	100	Charles Alexander, Esq.	100
Hon. George A. Drummond.	100	J. Evans, Esq.	100
Thomas Rimmer, Esq.	100	Henry Lyman, Esq.	50
William Dow, Esq.	100	Total	$1,950
Forward	$1,100		

12. Library and Museum.

Special Collections of Books Presented to the Library.

1. The Peter Redpath Collection of Historical Books, presented by Peter Redpath, Esq., of Montreal, 3,500 Volumes, with subsequent additions.
2. The Robson Collection of works in Archæology and General Literature, presented by Dr. John Robson, of Warrington, England, 3,436 Volumes.
3. The Charles Alexander Collection of Classical Works, presented by C. Alexander, Esq., of Montreal, 221 Volumes.
4. Frederick Griffin, Esq., Q.C., Collection of Books, being the whole of his Library, bequeathed by his will, 2,695 Volumes.
5. The Hon. Mr. Justice Mackay, Collection of Books, being the whole of his Library, 2,007 Volumes.
6. The "T. D. King Shakespeare Collection," presented by Lord Strathcona and Mount Royal and Sir Wm. C. Macdonald, of Montreal, being 214 Volumes.
7. The Ribbeck Library of Classical Literature, presented by Sir W. C. Macdonald, about 4,000 works.
8. The "Mendelssohn Choir Memorial Collection," presented by Joseph Gould, Esq., 200 Volumes.
9. The "John Horne" Collection of Canadian Portraits and Autographs, 177 in all.
10. The Sir J. W. Dawson Collection of works in Geology and Palæontology, presented by the Board of Governors.

Endowments or Library.

Wm. Molson, Esq., for Endowment of a Library Fund (1871)	$ 4,000
Hon. F. W. Torrance for Endowment of Mental, Moral and Political Philosophy Book Fund (1876)	1,000
Mrs. Redpath, for the Endowment of the Wm. Wood Redpath Memorial Fund (1881)	1,000

A Friend, by the Hon. F. W. Torrance, for Endowment of a Library Fund (1882)	$400
Hugh S. McLennan, Library Endowment, a gift from Estate late Hugh S. McLennan to the Library of McGill College, the income to be applied to binding (1892)	250
Total	$ 6,650

Subscriptions, Etc., to Library.

John Thorburn, for purchase of Books	$ 90
Andrew Drummond, do., for Applied Science	25
The Graduates in Arts and Applied Science of 1885 for purchase of Books	31
Ditto, ditto, of 1886	28
The late R. A. Ramsay, Esq., Bequest for purchase of books (1887)	1,000
Andrew Drummond, Esq., to Library Fund of Faculty of Applied Science	25
Lord Strathcona and Mount Royal, for purchase of books from the R. W. Boodle Library	200
Ottawa Valley Graduates' Society, for binding books in the University Library	25
Peter Redpath, Esq., in aid of the new catalogue of the Library (1892)	500
Mrs. Peter Redpath, for maintenance of Library, 1894 to date	40,500
Lord Strathcona and Mount Royal, donation for the purchase of books for the Library, particularly in the French Department (1897)	250
John H. R. Molson, donation for purchase of books for the Library (1897)	195
Hon. Treas. Redpath Memorial Fund, London, England. The balance remaining over of the above fund to be used for purchase of books for the Library	47
Estate late Hugh McLennan, for support of Travelling Libraries	1,500
Sir W. C. Macdonald, for purchase of books and for cataloguing (1902)	22,500
H. H. Wood, for the purchase of books	100
Total	$67,016

Special Collections Presented to the Museum.

1. The Holmes Herbarium, presented by the late Andrew F. Holmes, M.D.
2. The Carpenter Collection of Shells, presented by the late P. P. Carpenter, Ph.D.
3. The Collection of Casts of Ivory Carvings, issued by the Arundel Society, presented by Henry Chapman, Esq.
4. The McCulloch Collection of Birds and Mammals, collected by the late Dr. M. McCulloch, of Montreal, and presented by his heirs.
5. The Logan Memorial Collections of Specimens in Geology and Natural History, presented by the heirs of the late Sir W. E. Logan, LL.D., F.R.S.
6. The Dawson Collection in Geology and Palæontology, being the Private Collections of Principal Dawson, presented by him to the Museum.
7. The Bowles Collection of Lepidoptera, presented by Sir Wm. C. Macdonald and J. H. Burland, Esq.
8. R. Morton Middleton, Jr., London, Eng., Collection of Plants.
9. Collection of Butterflies, presented by the Members of the Board of Governors of the University.
10. Collection of Lepidoptera, presented by Sir W. C. Macdonanld. (See also "List of Donations to the Museum," printed in the Annual Reports of the University.)

Endowment for the Museum.

Wm. Molson, Esq., for the Endowment of a Museum Fund (1873) .. .. ..

II. Endowments and Subscriptions for the Faculty of Arts.

1. Buildings, Chairs, Etc.

Endowment Fund, 1856.

John Gordon McKenzie, Esq... .. ..$2,000
Ira Gould, Esq... .. .. 2,300—Total, $4,300

THE MOLSON CHAIR OF ENGLISH LANGUAGE AND LITERATURE, in 1856, endowed by the Honorable John Molson, Thomas Molson, Esq., and William Molson, Esq.—$20,000; and supplemented in 1892 by John H. R. Molson, Esq., with a further sum of $20,000. Total, $40,000.

THE PETER REDPATH CHAIR OF PURE MATHEMATICS (founded as Chair of Natural Philosophy), in 1871, endowed by Peter Redpath, Esq., $20,000.

THE LOGAN CHAIR OF GEOLOGY, in 1871, endowed by Sir W. E. Logan, LL.D., F.R.S., and Hart Logan, Esq.—$20,000.

THE JOHN FROTHINGHAM CHAIR OF PHILOSOPHY, 1873, endowed by Miss Louisa Frothingham,—$20,000; and supplemented in 1891 with a further sum of $20,000. Total, $40,000.

THE MAJOR HIRAM MILLS CHAIR OF CLASSICS, in 1882, endowed by the last will of the late Major Hiram Mills, of Montreal,—$42,000.

THE DAVID J. GREENSHIELDS ASSOCIATE PROFESSORSHIP OF ENGLISH LITERATURE, endowed by the last will of the late David J. Greenshields, Esq., of Montreal, with the sum of $40,000.

THE MACDONALD CHAIRS OF PHYSICS, in the Faculties of Arts and Applied Science, endowed by Sir William C. Macdonald,—$120,000.

THE MACDONALD CHAIRS OF CHEMISTRY, in the Faculties of Arts and Applied Science, endowed by Sir William C. Macdonald, in 1897 and 1901,—$110,000.

THE MACDONALD CHAIR OF BOTANY, endowed by Sir William C. Macdonald, in 1901,—$50,000.

THE WILLIAM DOW CHAIR OF POLITICAL ECONOMY, 1901, endowed by the Misses Dow,—$60,000.

THE MACDONALD CHAIR OF MORAL PHILOSOPHY, endowed by Sir William C. Macdonald in 1903,—$50,000.

THE CHARLES GIBB BOTANICAL ENDOWMENT, subscriptions received to date:—

A Friend.. .. ..$3,000
Mrs. Catherine Hill.. .. .. 200—Total, $8,200

THE MACDONALD PHYSICS BUILDING AND EQUIPMENT, in the Faculties of Arts and Applied Science. The gift of Sir William C. Macdonald, announced by him as a gift to the University in 1890, and formally opened February, 1893.

THE MACDONALD PHYSICS BUILDING MAINTENANCE FUND in the Faculties of Arts and Applied Science, endowed by Sir William C. Macdonald, in 1892 and 1896, $150,000.

THE MACDONALD CHEMISTRY AND MINING BUILDING AND EQUIPMENT, given to the University by Sir William C. Macdonald, in 1896, $267,141.80.

THE MACDONALD CHEMISTRY AND MINING BUILDING MAINTENANCE FUND, endowed by Sir William C. Macdonald, in 1897 and 1899, $225,000.

THE MACDONALD CHEMISTRY ENDOWMENT FUND, endowed by Sir William C. Macdonald, in 1890, $135,000.

THE KINGSFORD CHAIR OF HISTORY, endowed by Sir Wm. C. Macdonald, in 1898, $50,000.

THE DAWSON CHAIR OF GEOLOGY, endowed by Sir Wm. C. Macdonald in 1899, $50,000.

THE MACDONALD BUILDINGS REPAIR FUND, endowed in 1900 by Sir William C. Macdonald, $15,000.

2. Endowment for Pension Fund.

This endowment was given in 1894 to be invested, and the revenue used exclusively for providing Pensions or Retiring Allowances for members of the teaching staff of the Faculties of Arts and Applied Science:

Lord Strathcona and Mount Royal.. ..$50,000
John H. R. Molson.. 50,000
Sir William C. Macdonald .. .. 50,000—Total, $150,000

3. Exhibitions and Scholarships, Etc.

THE JANE REDPATH EXHIBITION, in the Faculty of Arts,—founded in 1868, by Mrs. Redpath, of Terrace Bank, Montreal, and endowed with the sum of $1,667.

THE MACDONALD SCHOLARSHIPS AND EXHIBITONS, 10 in number, in the Faculty of Arts—founded in 1871, and endowed in 1882 with the sum of $25,000 by Sir William C. Macdonald.

THE CHARLES ALEXANDER SCHOLARSHIP, for Classics—founded in 1871 by Charles Alexander, Esq. Endowed in 1893 with the sum of $2,000.

THE BARBARA SCOTT SCHOLARSHIP FOR CLASSICAL LANGUAGE AND LITERATURE—founded in 1884 by the last will of the late Miss Barbara Scott, of Montreal, and endowed with the sum of $2,000.

THE GEORGE HAGUE EXHIBITION—founded in 1881—Annual value, $125. Terminated in 1901.

THE MAJOR HIRAM MILLS MEDAL AND SCHOLARSHIP.—founded by the will of the late Major Hiram Mills, of Montreal, and endowed with the sum of $1,500.

T. M. THOMPSON, ESQ.—$250 for two Exhibitions in September, 1871; $200 for two Exhibitions in 1872,—$450.

REV. COLIN C. STUART—for the "Stuart Prize in Hebrew"—$60.

THE TAYLOR SCHOLARSHIP—founded in 1871, by T. M. Taylor, Esq.—Annual value $100—terminated in 1878.

PROFESSOR ALEXANDER JOHNSON—for Scholarship for three Sessions, terminated 1886-87—$350.

HER MAJESTY'S COMMISSION for the Exhibition of 1851—Nomination Scholarships for 1891, 1893, 1895, 1897, 1899, 1901 and 1903—value £150 annually, tenable for two years.

THE PHILIP CARPENTER FELLOWSHIP—founded by Mrs. Philip Carpenter, for the Maintenance of a Post-Graduation Teaching Fellowship or Scholarship in Natural Science or some branch thereof in the Faculty of Arts in McGill College, endowed in 1892 with the sum of $7,000.

THE ALEXANDER MACKENZIE MEMORIAL FUND, founded by the friends of the late Hon. Alex. Mackenzie, for the maintenance of fellowships or scholarships in Political Science, $9,534.05.

A LADY, to provide for three tuitions in the Faculty of Arts for sessions 1892-93, 1893-94.

THE NEW YORK GRADUATES' SOCIETY EXHIBITION—for an Exhibition in the Faculty of Arts to be associated with the name of Sir William Dawson—Annual value, $60—given in 1897, 1898, 1901, 1903.

To provide Bursaries in the Faculty of Arts, subscriptions from

W. W. Ogilvie .. ..1898 and 1899....$2,000
Hugh McLennan.. ..1898 and 1899.... 240
D. Macmaster ... ..1898..... 120

4. Edowments and Donations of Medals and Prizes.

In 1856 Henry Chapman, Esq., founded a gold medal, to be named the "Henry Chapman Gold Medal," to be given annually in the graduating class in Arts. This medal was endowed by Mr. Chapman in 1874 with the sum of $700.

In 1860 the sum of £200, presented to the College by H.R.H. the Prince of Wales, was applied to the foundation of a Gold Medal, to be called the "Prince of Wales Gold Medal," which is given in the graduating class for Honour Studies in Mental and Moral Philosophy.

In 1864 the "Anne Molson Gold Medal" was founded and endowed by Mrs. John Molson, of Belmont Hall, Montreal, for an Honour Course in Mathematics and Physics.

In the same year the "Shakespeare Gold Medal," for an Honour Course, to comprise and include the works of Shakespeare and the Literature of England from his time to the time of Addison, both inclusive, and such other accessory subjects as the Corporation may from time to time appoint, was founded and endowed by citizens of Montreal, on occasion of the three hundredth anniversary of the birth of Shakespeare.

In the same year the "Logan Gold Medal" for an Honour Course in Geology and Natural Science was founded and endowed by Sir William Logan, L.LD., F.R.S., F.G.S., etc.

In 1874 a Gold and a Silver Medal were given by His Excellency the Earl of Dufferin, Governor-General of Canada, for competition in the Faculty of Arts, and continued till 1878.

In 1875 the "Neil Stuart prize in Hebrew" was endowed by Neil Stuart, Esq., of Vankleek Hill, in the sum of $340.

In 1880 a Gold and a Silver Medal were given by His Excellency the Marquis of Lorne, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1883.

In 1884 a Gold and a Silver Medal were given by His Excellency the Marquis of Lansdowne, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1888.

In 1889 a Gold and a Silver Medal were given by His Excellency Lord Stanley, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1893.

THE "CHALES G. COSTER MEMORIAL PRIZE" for general proficiency —given annually by Colin H. Livingstone, Esq., B.A.; founded in 1889.

In 1894 a Gold and a Silver Medal were given by His Excellency the Earl of Aberdeen, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1898.

In 1899 a Gold and a Silver Medal were given by His Excellency the Earl of Minto, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued to date.

5. Subscriptions for the Support of the Chair of Botany. 1883-84.

Sir Wm. Dawson	$500	per annum,	5 years,	being..	$2500
Lord Strathcona and Mount Royal	250	"	"	"	1250
J. H. R. Molson, Esq.	100	"	"	"	500
Mrs. J. H. R. Molson	100	"	"	"	500
G. Hague, Esq.	100	"	"	"	500
Mrs. Redpath	100	"	"	"	500
Hugh McKay, Esq.	100	"	"	"	500
Robert Moat, Esq.	100	"	"	"	500
Sir Wm. C. Macdonald	100	"	"	"	500
Charles Gibb, Esq.	50	"	"	"	250
Miss Orkney	50	"	"	"	250
Robert Mackay, Esq.	50	"	"	"	250
Mrs. Wm. Molson	50	"	"	"	250
Mrs. John Molson	50	"	"	"	250
John Stirling, Esq.	50	"	"	"	250
Warden King, Esq.	50	"	"	"	250
Miss Hall	50	"	"	"	250

Robert Angus, Esq.	$50	per annum,	5 years,	being	$250
D. A. P. Watt, Esq.	50	"	"	"	250
Hugh McLennan, Esq.	25	"	"	"	125
Sir Joseph Hickson	10	"	"	"	50
Mrs. Phillips					20
Total					$9,945

6. Botanic Garden, Etc.

Subscriptions, 1890–91.

Hugh McLennan, Esq.	$ 100	Forward	$ 900
Gilman Cheney, Esq.	100	Jonathan Hodgson, Esq.	100
James Johnston, Esq.	100	Robert Mackay, Esq.	100
James Slessor, Esq.	100	H. Shorey, Esq.	50
A Friend	100	J. S. Shearer, Esq.	50
Hugh Graham, Esq.	100	Geo. Sumner, Esq.	25
A. F. Gault, Esq.	100	A. Ramsay & Co.	25
W. T. Costigan, Esq.	100	Garth & Co.	25
Jonathan Brown, Esq.	100		
Forward	$ 900	Total	$1,275

To Erect Plant House in Botanic Garden.

Lord Strathcona and Mount Royal	$ 362.00
John H. R. Molson, Esq.	361.51
Sir William C. Macdonald	361.02
Total	$1,084.53

For Support of Botanical Laboratory.

Sir W. C. Macdonald (1900)	$ 300.00

7. Subscriptions in Aid of the Chair of Hebrew.

Warden King, Esq.	in 1889	$50	per annum,	3 years,	being	$ 150
Sir William Dawson	"	50	"	"	"	150
Hon. Hugh Mackay	"	50	"	"	"	150
A. F. Gault, Esq.	"	25	"	"	"	75
George Hague, Esq	"	25	"	"		75
T. A. Dawes, Esq.	"	25	"	"	"	75
S. Carsley, Esq.	"	25	"	"	"	75
S. Davis, Esq.	in 1892					20
Warden King, Esq.	"	50	per annum	for 3 years		150
A. F. Gault, Esq.	"	50	"	"		150
Robert Mackay, Esq.	"	50	"	"		150
Hugh McLennan, Esq.	"	25	"	"		75
George Hague, Esq.	"	25	"	"		75
T. A. Dawes, Esq.	"	25	"	"		75
S. Carsley, Esq.	"					25
J. Murphy, Esq.	"					25
Total						$1495

8. Subscriptions to Provide Sessional Lecturers, Etc.

Lord Strathcona and Mount Royal, sessions 1891-92 to 1898-99	$42,000
Mrs. John H. R. Molson, sessions 1891-92 to 1899-1900	8,300
Sir Wm. C. Macdonald, to provide for certain salaries in the Department of Physics, etc., sessions 1894-95 and 1895-96	2,627
Total	$52,927

9. Endowments for Apparatus

The Local Committee of the British Association for the Advancement of Science to found the British Association Apparatus Fund in the Faculties of Arts and Applied Science, in commemoration of the meeting of the Association in Montreal in 1884 .. .. ..

3. Endowments Held in Trust by the Board of Royal Institution.

The "Hannah Willard Lyman Memorial Fund," contributed by subscriptions of former pupils of Miss Lyman, and invested as a permanent endowment to furnish annually a Scholarship or Prizes in a "College for Women," affiliated to the University, or in classes for the Higher Education of Women, approved by the University. The amount of the fund is at present $1,100.

The "Annie McIntosh Prize," contributed by pupils and friends of the late Miss Annie M. McIntosh, of Bute House, Montreal. The income to be given as a prize to women in the Faculty of Arts, $425.

IV. Endowments and Subscriptions for the Faculty of Applied Science.

1. Buildings, Chairs, Etc.

THE WILLIAM SCOTT CHAIR OF CIVIL ENGINEERING, in 1884, endowed by the last will of the late Miss Barbara Scott, of Montreal,—$30,000

THE THOMAS WORKMAN DEPARTMENT OF MECHANICAL ENGINEERING—founded in 1891 under the last will of the late Thomas Workman, Esq., who bequeathed the sum of $117,000—$60,000 for the maintenance of a Chair of Mechanical Engineering, with the assistance, shops, machinery and apparatus necessary thereto, $57,000 to be expended in provision of necessary buildings, machinery and apparatus.

SIR WILLIAM C. MACDONALD, in 1890, towards erection of Thomas Workman Workshops, $20,000.

THE MACDONALD ENGINEERING BUILDING AND EQUIPMENT—announced by Sir Wm. C. Macdonald as a gift to the University in 1890, and formally opened February, 1893.

THE MACDONALD PHYSICS BUILDING AND EQUIPMENT in the Faculties of Arts and Applied Science, the gift of Sir William C. Macdonald announced by him as a gift to the University in 1890, and formally opened February, 1893.

THE MACDONALD CHAIRS OF PHYSICS, in the Faculties of Arts and Applied Science, endowed by Sir William C. Macdonald—$120,000.

THE MACDONALD CHAIR OF ELECTRICAL ENGINEERING—endowed by Sir Wm. C. Macdonald, in 1891, with the sum of $40,000; in 1898, with the additional sum of $10,000. Total, $50,000.

THE MACDONALD ENGINEERING BUILDING MAINTENANCE FUND, endowed by Sir Wm. C. Macdonald, in 1892 and 1896.—$85,000.

THE MACDONALD PHYSICS BUILDING MAINTENANCE FUND in the Faculties of Arts and Applied Science, endowed by Sir Wm. C. Macdonald, in 1892 and 1896—$150,000.

THE MACDONALD CHEMISTRY AND MINING BUILDING AND EQUIPMENT, given to the University by Sir William C. Macdonald, in 1896.—$267,141.80.

THE MACDONALD CHEMISTRY AND MINING BUILDING MAINTENANCE FUND, endowed by Sir William C. Macdonald, in 1897 and 1899—$225,000.

THE MACDONALD CHAIR OF MINING ENGINEERING, endowed in 1896 and 1903 by Sir William C. Macdonald, with the sum of $62,500.

THE MACDONALD CHAIR OF ARCHITECTURE, endowed in 1896 by Sir William C. Macdonald, with the sum of $50,000.

THE MACDONALD CHAIRS OF CHEMISTRY, in the Faculties of Arts and Applied Science, endowed by Sir William C. Macdonald, with the sum of $110,000.

THE MACDONALD ARCHITECTURAL DEPARTMENT MAINTENANCE FUND, endowed by Sir William C. Macdonald, in 1898.—$10,000.

THE MACDONALD MINING AND METALLURGICAL DEPARTMENT ENDOWMENT FUND, endowed by Sir Wm. C. Macdonald, in 1899.—$55,000.

THE MACDONALD CHEMICAL DEPARTMENT ENDOWMENT FUND, endowed by Sir Wm. C. Macdonald, in 1900.—$135,000.

THE MACDONALD BUILDINGS REPAIR FUND, endowed in 1900 by Sir William C. Macdonald.—$15,000.

2. Endowment for Pension Fund.

This endowment was given in 1894 to be invested and the revenue used exclusively for providing Pensions or Retiring Allowances for members of the teaching staff of the Faculties of Arts and Applied Science.

Lord Strathcona and Mount Royal..$50,000
John H. R. Molson 50,000
Sir William C. Macdonald .. .. 50,000—Total, $150,000

3. Exhibitions and Scholarships.

THE SCOTT EXHIBITION.—Founded by the Caledonian Society of Montreal, in commemoration of the Centenary of Sir Walter Scott, and endowed in 1872 with the sum of $1,100, subscribed by members of the Society, and other citizens of Montreal. The Exhibition is given annually in the Faculty of Applied Science—Annual value, $50.

THE BURLAND SCHOLARSHIP, founded 1882 by J. H. Burland, B.A.Sc., $100 for a Scholarship in Applied Science for three years, being $300.

HER MAJESTY'S COMMISSION for the Exhibition of 1851—Nomination Scholarships for 1891, 1893, 1895, 1897, 1899, 1901 and 1903; value, £150 annually, each tenable for two years.

THE DR. T. STERRY HUNT SCHOLARSHIP.—Founded in 1894 by the will of the late Dr. T. Sterry Hunt, and endowed with the sum of $2,082, the income to be given and paid annually to a student or students of Chemistry.

THE CANADIAN GENERAL ELECTRIC CO. SCHOLARSHIPS, given in 1900-1903.—$1200.

4. Medals and Prizes.

In 1880 a Gold and a Silver Medal were given by His Excellency the Marquis of Lorne, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1883.

In 1884 a Gold and a Silver Medal were given by His Excellency the Marquis of Lansdowne, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1888.

In 1885 the British Association Gold Medal, for competition in the Graduating class in the Faculty of Applied Science, was founded by subscription of members of the British Association for the Advancement of Science, and by gift of the Council of the Association, in commemoration of its meeting in Montreal in the year 1884.

In 1889 a Gold and a Silver Medal were given by His Excellency Lord Stanley, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1893.

In 1894 a Gold and a Silver Medal were given by His Excellency the Earl of Aberdeen, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued till 1898.

In 1899 a Gold and a Silver Medal were given by His Excellency the Earl of Minto, Governor-General of Canada, the former for competition in the Faculty of Arts, the latter for competition in the Faculty of Applied Science. Continued to date.

5. Endowment and Subscriptions for Maintenance of Faculty.

Endowment Fund.

Daniel Torrance, Esq.	$5,000
Charles J. Brydges, Esq.	1,000
R. J. Reekie, Esq.	100
Total	$6,100

Graduates' Endowment Fund.

Graduates' Endowment Fund—Class 1890, $70 a year for 5 years, $350; received to date	$85

Annual Subscriptions, 1871-1879.

Hon. James Ferrier ($100 per annum for 10 years)	$ 1,000
Peter Redpath, Esq. ($400 per annum for 10 years)	4,000
John H. R. Molson, Esq. ($400 per annum for 10 years)	4,000
George H. Frothingham, Esq. ($400 per annum for 7 years)	2,800
T. James Claxton, Esq. ($100 per annum for 6 years)	600
Donald Ross, Esq. ($50 per annum for 5 years)	250
Miss Mary Frothingham ($400 per annum for 3 years)	1,200
H. McLennan, Esq. ($100 per annum for 5 years)	500
A. F. Gault, Esq. ($100 per annum for 5 years)	500
Gilbert Scott, Esq. ($100 for 2 years)	200
Joseph Hickson, Esq. ($100 for 2 years)	200
Sir William Dawson, ($300 for 2 years)	600
His Excellency the Marquis of Lorne	500
Mrs. Redpath (Terrace Bank)	100
Total	$16,450

Subscriptions towards Maintenance of Engineering Department.

Sir Wm. C. Macdonald,	sessions 1891-92 to 1897-98	$56,341
do	for advertising	675
do	to cover certain salaries, session 1894-95 and 1897-98	1,920
do	to meet the expenses of the course of summer work for Mining Engineering Students (1898)	825
do	Electric Light Re-installation in Engineering Building, 1899	6,000
do	to cover salary of Assistant in Chemical Department, session 1898-99 and session 1899-1900	1,000
do	Electric Storage Batteries, Reinstallation of Electric Lighting in Physics Building, etc., 1901	30,000
A Friend, towards maintenance of Electrical Engineering Department, 1901 and 1902		800
Total		$97,561

Subscriptions to Provide Lectures in Mechanical and Sanitary Engineering.

E. B. Greenshields, Esq.	$ 50
J. E. Bovey, Esq	50
Professor H. T. Bovey	61
Forward	$161
Forward	$161
Jeffrey H. Burland, B.A.Sc., $100 for 2 years	200
Smaller amounts	40
Total	$401

Subscriptions for Maintenance of Chair of Practical Chemistry, 1862.

Hon. C. Dunkin, M.P.	$1,200
Sir William Dawson	1,200
Peter Redpath, Esq.	226
Total	$2,626

For Maintenance of Chair of Mining Engineering and Metallurgy, 1891.

R. B. Angus, Esq.	$2,000	
Mrs. Dow	1,000	
Hugh McLennan, Esq.	1,000	
Miss Benny	1,000	
T. A. Dawes, Esq.	750	
A. A. Ayer, Esq.	250	
G. W. Reid, Esq.	100	
Evans Bros.	100	
	$ 6,200	
Payable in Three Years.		
Sir W. Dawson	1,000	
Alex. Stuart, Esq. (London, Eng.)	1,500	
R. G. Reid, Esq.	1,500	
Forward	$4,000	$6,200
Forward	$4,000	$6,200
E. K. Greene, Esq.	750	
Dr. T. Brainerd.	750	
A. F. Gault, Esq.	750	
Messrs. H. & A. Allan	750	
Hector Mackenzie, Esq.	750	
Peter Lyall Esq.	750	
James Ross, Esq.	600	
A. Robertson, Esq.	300	
John Duncan, Esq.	300	
George Hague, Esq.	300	
Jonathan Hodgson, Esq.	300	
James Moore, Esq.	200	
Messrs. Ames & Holden	150	
James Cooper, Esq.	150	
	10,800	
Total		$17,000

Remodelling East Wing for Class Rooms for Faculty of Applied Science, 1888.

John H. R. Molson, Esq.	$3,000
Sir Wm. C. Macdonald	3,000
Total	$6,000

6. Endowments for Apparatus.

The Local Committee of the British Association for the Advancement of Science, to found the British Association Apparatus Fund in the Faculties of Arts and Applied Science, in commemoration of the meeting of the Association in Montreal in 1884	$1,500

7. Subscriptions, etc., for Apparatus.

A lady, for the purchase of Mining Models	$1,000
Thos. McDougall, Esq., for the same	25
J. Livesey, Esq., through Dr. Harrington, for the same	50
Geo. Stephen, Esq., for the same	50
Chas. Gibb, Esq., donation for Apparatus in Applied Science	50
The Local Committee for the reception (1881) of American Society of Civil Engineers for the purchase of Appliances for the department of Civil Engineering in Faculty of Applied Science	475
Capt. Adams, Chemical Apparatus	10
J. H. Burland, B.A.Sc., Chemical Apparatus	25
Sir Wm. C. Macdonald—	
For Surveying and Geodetic Apparatus in 1890	1,500
For new apparatus, etc., in the Mechanical Department, 1900.	5,000
Total	$8,185

8. List of Subscribers and Donors to the Equipment of the New Engineering Buildings of McGill University to May, 1902.

Abbott W..... .....Equipment
Adams, Capt. R. C.....
Mining Photographs
American Locomotive Co.....
Drawings
American Bridge Co...Drawings
American Steam Gauge Co. (Boston) ..... Indicator
Archbald, H. .....Books
Ashton Valve Co. (Boston).....
Sectional Valve
Aurora Metal Co.....Specimens
Bell Telephone Co.....
Telephone Apparatus
Bertram & Sons, J. (Dundas)....
24 in. Planer
Bethlehem Iron Co....Specimens
Birch & Co., J. (England).....
Hydraulic Tubes
Birks, Henry ..... Clock
Bishop, George .....Equipment
Blackwell, Kennet ...Equipment
Blake Mnfg. Co., The George F.
Blue Prints of Pump
Blake Pump Co., The Geo. (New York & Boston).....Pump
Bluenose Mining Co.....Ore
Bremner, A. $50
Brockhaus, Herr F. A.....Books
Brodie & Harvey.....$50
Brunner, Mond & Co.....Ore
Brush, G. .....Boiler
Cameron, General...Rotary Drill
Campbell Tile Co. (England), per Jordan & Locker.....
Equipment
Campbell, Kenneth $50
Canada Switch Co.....Castings
Canadian General Electric Co. (Toronto), per F. Nicholls.....
Equipment
Canada General Electric Co.....
Electric Drill, Edison Generator, Dynamo, Motor
Canada Rand Drill Co.....
Rock Drill
Carnegie Steel Co.....Specimens
Carsley, S. $100
Carus-Wilson, Prof. C. A.....
Equipment
Cary, A. A.....
Photographs of Boilers
Chadwick, F.....Truss Models
Chanteloup, E. $50
Claxton, T. J...Timber Beams of large Scantling for Testing Laboratory
Costigan, J. .....Equipment
Cowen, Amos..Samples of Bricks
Cowper, P. H.....
Model of Steam Engine
Craig, Messrs. J. & M. (Kilmarnock, Scotland)—Sanitary Sections (full size) and models
Crocker-Wheeler Electric Motor Co., The (New York)....Motor Armature, Prints
Crosby Steam Gauge and Valve Co., The (Boston)..Gauge and Valve, Indicator and Valves
Cumberland Ry. & Coal Co..Ore
Darling, Brown & Sharpe (Providence, R.I.).....6 in. Rule
Date, John .....Equipment
Dawson, W. B.....
Books and Specimens
Dolworth Mining Co...5 tons ore
Dominion Coal Co..Miners' Tools
Dominion Wire Manfg. Co., per F. Fairman .....Shaper
Douglas, James .....Ore
Drummond, Hon. G. A.....Prism
Drummond G. E.....Ore
Drysdale, D. .....Tools
Drysdale, W. .....Tools
Earle, S. R.....Air Injector
Edison General Electric Co.....
Two 450 light dynamos, Brake Shoe and Disc
Egleston, Dr. (New York).....
Framed Photographs of the Moon, Books, Photos, etc.
Electric Welding Company (Boston) ..... Equipment
"Engineering Magazine" (New York City) Mining Illustrations and Photographs
Eureka Tempered Copper Co....
Equipment
Eustis Mining Co.....12 tons ore
Ewan, A. $100
Felton & Guilleaume.....
Samples of Cable Wire, etc.
Forsyth, R. .....Equipment
Frothingham & Workman..Tools
Furlong, G. W., B.A.Sc.....
Specimens of Pine and Wood bored by Teredos
Gardner, & Son, R. W.....
16 in. Lathe
Gardner, R. .....Equipment
Garth & Co.....$500
Garth, Henry .....Equipment
Girdlestone, J. .....Plans

Government of New South Wales Collection of Australian Timbers
Government of Queensland, Australia..Collection of Queensland Timbers
Gower, W. E.....
Graham, H. $100
Grier, G. A. .....Equipment
Guggenheim Smelting Co..... Specimens
Gurney & Co., E. & C.....$604
Hadfield, Messrs. (Sheffield)..... Equipment
Hamilton Bridge Works Co..... A Model of the Stoney Creek Arch
Hamilton Powder Co., Electrical Blasting Machine, and Appliances, etc., for blasting.
Hearn & Harrison, per L. Harrison.....Barometer & Clock
Hersey, R. $1200
Hodgson, Jonathan $200
Holden, A. .....Equipment
Hosoki, Dr., of Tokio, Japan..... Collection of Japanese Wood
Hoyt Metal Co.....Specimens
Hughes & Stephenson.Equipment
Hutton, W. H.....Equipment
Illinois Steel Co.....Photos, etc.
Ingersoll Rock Drill Co..... Rock Drill
Irwin & Hopper.....Equipment
Ives. H. R. .....Cupola
Joyce, Alfred $50
Jordan & Locker.....Equipment
Kennedy, John .....Equipment
Kennedy, W. & Sons..... American Turbine
Kennedy, W. (Owen Sound)..... Pump
Kerr, R. & W.....Tools
King & Son, Warden.....$534
Laughlin-Hough Drawing Table Co. .....Drawing Tables
Lachine Rapids Co..... Electrical apparatus and power
Laurie & Bro., J..... Compound Engine
Lawson, A. J. .....Equipment
Lehigh Zinc & Iron Co..Franklin Furnace, N.J., Mining Specimens and Photographs.
Lindsay & Co., C. F..Equipment
Lovell & Son, John.....Books
Lyster, A. G.....Drawings and Sketches of London and Liverpool Docks.
McPherson, A. .....Tools
Mason, Dr. .....Equipment
Maxwell & Co., E. J..Equipment
McCarthy, D. & J. (Sorel)....$300
McDougall, Mrs. J.....$4000
McLachlin Bros. (Arnprior)..... Timber
McLaren, D. $100
McLaughlin Bros. .....Timber
McNally & Co., W.....$100
McPherson Sand Box Co. (Troy, N. Y.).....Model of Sand Box
Midvale Steel Co.....Specimens
Miller Bros. & Sons.....Elevator
Mitchell, P.....Equipment ($300)
Mitchell & Co., R.....Equipment
Naismith, P. L., B.A.Sc..... Specimens
Nalder Bros. & Co. (England)... Standard Cell
National Electric Mfg. Co....100 Volt Transformer, Transformers
National Lead Co.....Specimens
Nicholson, Peter $100
Norton A. O., Boston, Mass..Two Norton Ball-bearing Lifting-Jacks.
Norton Emery Wheel Co. (Worcester, U.S.) .....Equipment
Notman, Wm. .....Photographs
Ohio Brass Co.....Fittings
Ogilvie W. $500
Ontario Graphite Co..... Graphite Rock
Packard Elec. Co..Transformers
Palmer, A. .....Equipment
Parker, M. .....Equipment
Paton, H. .....Equipment
Peckham Motor Truck and Wheel Co. (Kingston, N.Y.).... Model of Motor Truck
Pelton Water Wheel Co. (New York) .....Two Motors
Pennsylvania Railroad Co..... Working Drawings of Locomotives (32)
Perrin & Co., W. R..... Press and force pump
Phelps Engine Co., per A. R. Williams & Co....Dake Steam Engine, 4 Horse Power Engine
Pillow, J. A.....$250
Pittsburgh Reduction Co..... Specimens
Pratt & Whitney (Hartford Conn.)..Epicycloidal Gear Model
Prowse, G. R.....Equipment
Queensland Government, per Sir Thos. McIlwraith..Collection of Timbers.
Radiator Co. (Toronto).....$500
Ramsay & Son, A.....$100
Rathbun, E. W.....Samples of Fire-proof Construction ($112)
Reddaway & Co., F..... Belt (value $50)

Redpath, F. R.....Equipment
Redpath, Mrs. $100
Reed, G. W.....$100
Reford, R. $1000
Reid, R. .....Equipment
Reid, R. G. $1000
Renouf, E. M.....Books
Rhode Island Locomotive Works
Photos of Locomotives
Rife's Hydraulic Engine Mfg. Co. (Roanoke, Va., U.S.A.).....
Hydraulic Ram
Robb & Armstrong.....
80 H.P. High Speed Engine
Robertson, J. .....Equipment
Rogers, Professor (Waterville, Maine) ..... Equipment
Ross, Jas. $500
Rodden, W. .....Equipment
Royal Electric Co.....Motors, Dynamos, Transformers, Coils, Condensers
Rutherford, W. .....Equipment
Sadler, G. (Robin & Sadler).....
Belting ($400)
Seeley, John .....Insulators
Schaeffer & Budenbery (Brooklyn, N.Y.)....Double Indicator
Scholes, F. $100
Scovill Mfg. Co.....Equipment
Sharp, Stewart & Co. (Manchester, Eng.) .....Equipment
Shearer, James $200
Sheppard, Chas. $200
Siemens Bros. (London, Eng.)...
Cable Samples
Smith C. B. .....
Framed Photos of Bridges (2)
Smith, R. .....Equipment
Spence, J. P., C.E..Specifications and drawings, showing construction of Sault Ste. Marie Canal Locks.
Smith, R. Guilford.....Books
Stanley Elect. Co.....Wattmeter
Steel Co, of Scotland, The.....
Samples of Cable Wire, etc.
St. George, P. W.....Models
Stirling Co., The..Sectional Blue Prints of Boilers
Sturtevant Co., The B. P. (Boston) ..... Blowers
Swan Lamp Mfg. Co.....Lamps
Taylor, A. T.....$300
Tees & Co.....Equipment
Thomas, R. & Son.....Insulators
Thomson-Houston Co. (Boston). Incandescent Dynamos
Twyford & Co .....Equipment
U. S. Navy Const. Dept.....
Drawings, etc.
Vail, Stephen.....Piece of first Telegraph Wire Used
Walker & Co., James.....Tools
Wanklyn, F. L.....Equipment
Ward, Hon. J. K.....$50
Warrington Wire Co.....
Cable Samples
Waterous Engine Co.....
Drawings, etc.
Westinghouse Air Brake Co.....
Drawings, etc.
Weston Elect. Instr. Co.....
Ammeters, etc.
Wetherill Separating Co.....
Ore Samples
Whittier Machine Co. (Boston)..
Electric Elevator
Wiley & Sons, John (New York)
Books
Yale & Towne Mfg. Co. (Stamford, Conn.) .....Equipment
Yates & Thom.....
Blue Prints of Machinery

The above representing a total of about $80,000.

9. Faculty of Applied Science Library Endowment, 1893.

Hugh Paton..	$ 25
A. Joyce..	25
R. Gardner..	50
H. Garth..	100
Hughes & Stephenson..	100
R. Mitchell..	300
Forward..	$600

Forward..	$600
W. Rodden	25
M. Parker	25
Robin & Sadler..	50
J. Robertson, Esq..	50
Mrs. John McDougall (1895)..	20
Total..	$770

V. Endowments and Subscrptions in Aid of the Faculty of Medicine.

1. Leanchoil Endowment, 1884.

Lord Strathcona and Mount Royal.. .. ..$50,000

2. Campbell Memorial Endowment, 1884.

Established to commemorate the service rendered to the Faculty during 40 years by the late Dean, George W. Campbell, M.D., LL.D.

Mrs. G. W. Campbell. .. ..$	2000
H. A. Allan, Esq.	1500
Lord Strathcona and Mount Royal..	1500
Lord Mount Stephen..	1000
R. B. Angus, Esq...	1000
Hon. Geo. A. Drummond ..	1000
Alex. Murray, Esq.	1000
Robert Moat, Esq.	1000
Sir W. C. Macdonald..	1000
A Friend..	1000
Duncan McIntyre, Esq.. ..	1000
A. F. Gault, Esq..	1000
M. H. Gault, Esq.	1000
G. W. Stephens, Esq..	1000
James Benning, Esq..	1000
R. P. Howard, M.D.	1000
G. B. & J. H. Burland, Esqs.	1000
Miss Elizabeth C. Benny ..	1000
J. C. Wilson, Esq..	1000
Mrs. John Redpath	1000
Hon. John Hamilton..	1000
Miss Orkney	1000
Hugh Mackay, Esq.	1000
Hector Mackenzie, Esq.. ..	1000
Thomas Workman, Esq. ..	1000
Hugh McLennan, Esq... ..	1000
O. S. Wood, Esq.	1000
Frank Buller, M.D.	500
James Burnett, Esq...	500
Andrew Robertson, Esq.. ..	500
Robert Mackay, Esq.	500
John Hope, Esq.	500
Alex. Urquhart, Esq..	500
R. A. Smith, Esq...	500
George Hague, Esq...	500
J. K. Ward, Esq.	500
Warden King, Esq.	500
John Stirling, Esq.	500
John Rankin, Esq.	500
Robert Reford, Esq...	500
Messrs. Cantlie, Ewan & Co.	500
Messrs. J. & W. Ogilvie ..	500
Randolph Hersey, Esq... ..	500
John A. Pillow, Esq..	500
S. Carsley, Esq.	500
D. C. MacCallum, M.D... ..	500
Messrs. S. Greenshields, Son & Co..	500
Forward .. ..$	39,000

Forward .. ..$	39,000
Jonathan Hodgson, Esq. ..	500
George Ross, M.D.	500
T. G. Roddick, M.D.	500
Wm. Gardner, M.D.	500
Messrs. Cochrane, Cassils & Co.	500
Sir Joseph Hickson	500
Allan Gilmour, Esq., Ottawa	500
R. W. Shepherd, Esq.	500
G. E. Fenwick, M.D...	300
Miles Williams, Esq.	300
G. P. Girdwood, M.D.	250
Charles F. Smithers, Esq..	250
John Kerry, Esq...	250
A. Baumgarten, Esq..	250
R. W. Elmenhorst, Esq.. ..	250
W. F. Lewis, Esq.	250
George Armstrong, Esq. ..	250
J. M. Douglas, Esq...	250
Messrs. H. Lyman, Sons & Co.	250
F. J. Shepherd, M.D...	250
Duncan McEachran, Esq., F.R.C.V.S...	200
Benj. Dawson, Esq.	200
R. Wolff, Esq.	150
James Stewart, M.D..	150
A. T. Paterson, Esq...	100
H. W. Thornton, M.D. (New Richmond, Q.)	100
C. B. Harvey, M.D. (Yale, B.C.)..	100
D. Cluness, M.D. (Nanaimo, B.C.)..	100
W. Kinlock, Esq.	100
Hua, Richardson & Co.. ..	100
Mrs. Cuthbert (New Richmond, Q.)	100
J. M. Drake, M.D.	100
Hugh Paton, Esq..	100
R. T. Godfrey, M.D...	100
T. A. Rodger, M.D.	100
W. A. Dyer, Esq..	100
Geo. W. Wood, M.D. (Faribault, Minn.)..	100
A. A. Browne, M.D.	100
Geo. Wilkins, M.D.	100
R. L. MacDonnell, M.D. ..	100
Forward .. ..$	48,400

Forward	$48,400
Jos. Workman, M.D. (Toronto)	50
Henry Lunam, B.A., M.D. (Campbellton, N.B.)	50
Hon. Sir A. T. Galt	50
R. J. Alloway, M.D.	30
R. J. B. Howard, M.D.	25
Louis T. Marceau, M.D. (Napierville, Q.)	25
Griffith Evans, M.D. (Vet. Dept. Army)	26
J. J. Farley, M.D. (Belleville)	25
Henry R. Gray, Esq.	25
J. E. Brouse, M.D. (Prescott)	20
R. N. Rinfret (Quebec)	20
Robert Howard, M.D. (St. Johns)	20
Drs. J. & D. McIntosh Vankleek Hill)	20
J. H. McBean, M.D.	15
J. C. Rattray, M.D. (Cobden, O.)	10
E. H. Howard, M.D. (Lachine)	10
Forward	$48,821
J. W. Oliver, M.D. (Clifton, O.)	10
D. A. McDougall, M.D. (Ottawa, O.)	10
A. Poussette, M.D. (Sarnia, O.)	10
A. Ruttan, M.D. (Napanee, O.)	10
James Gunn, M.D. (Dunham, O.)	10
J. McDiarmid, M.D. (Hensall, O.)	5
W. J. Derby, M.D. (Rockland, O.)	5
J. Gillies, M.D. (Teeswater, O.)	5
J. B. Benson, M.D. (Chatham, N.B.)	5
L. A. Fortier, M.D. (St. David, Q.)	5
J. A. McArthur, M.D. (Fort Elgin, O.)	5
John Campbell, M.D. (Seaforth, Ont.)	5
Total	$48,906

3. Endowed Chairs, Donations, Etc.

LORD STRATHCONA AND MOUNT ROYAL CHAIR OF PATHOLOGY, endowed in 1893 by Lord Strathcona and Mount Royal with the sum of .. $50,000

LORD STRATHCONA AND MOUNT ROYAL ENDOWMENT FOR THE DEPARTMENT OF HYGIENE, endowed in 1893 by Lord Strathcona and Mount Royal with a sum of .. 50,000

MRS. MARY DOW BEQUEST—Bequest by the will of the late Mrs. Mary Dow for the Faculty of Medicine, 1893, $10,000 less Government Tax of 10 per cent.. 9,000

JOHN H. R. MOLSON DONATION—In 1893, $25,000 for the purchase of land, and $35,000 for additional building and equipment. 60,000

WALTER DRAKE, ESQ., for benefit of Chair of Physiology, an annual donation of $500 given 1891 to 1897.. 3,500

DR. ROBERT CRAIK FUND—

Mrs. John McDougall, toward formation of above (1893-94).... $1,000

Jane F. Learmont, bequest, do. do. (1894) 3,000

4,000

JOSEPH MORLEY DRAKE CHAIR OF PHYSIOLOGY, endowed in 1898 by Walter Drake, Esq., with the sum of .. 25,000

LADY STRATHCONA AND MOUNT ROYAL Donation for erection and equipment Additional Buildings (1899) .. 50,000

HON. MRS. HOWARD Donation for erection and equipment Additional Buildings (1899) .. 50,000

D. MORRICE, ESQ., Donation for equipment of Pharmacology Laboratories .. 1,500

3. Medals and Scholarships.

In 1865 the "Holmes Gold Medal" was founded by the Faculty of Medicine as a memorial of the late Andrew Holmes, Esq., M.D., LL.D., late Dean of the Faculty of Medicine, to be given to the best student in the graduating class in Medicine, who should undergo a special examination in all the branches whether Primary or Final.

In 1878 the "Sutherland Gold Medal" was founded by Mrs. Sutherland of Montreal, in memory of her late husband, Prof. William Sutherland, M.D., for competition in the classes of Theoretical and Practical Chemistry in the Faculty of Medicine, together with creditable standing in the Primary Examinations.

THE DAVID MORRICE SCHOLARSHIP—in the subject of Institutes of Medicine, in the Faculty of Medicine—founded in 1881—value $100. (Terminated in 1883.)

5. Library, Museum and Apparatus.

For the Fittings of the Library and Museum of the Faculty of Medicine, 1872.

G. W. Campbell, A.M., M.D.	$1200	Forward	$2,000
W. E. Scott, M. D.	200	Robert Craik, M.D.	200
Wm. Wright, M.D.	200	Geo. E. Fenwick, M.D.	200
Robert P. Howard, M.D.	200	Joseph M. Drake, M.D.	200
Duncan C. MacCallum, M.D.	200	George Ross, M.A., M.D.	50
Forward	$2,000	Total	$2,650

The Professors and Lecturers in the Summer Sessions of the Faculty of Medicine ... { Donation to Apparatus, Museum Library, etc., of the Medical Faculty, 1887, $1,182; 1888, $1,023. } $2,205

For Physiological Laboratory of Faculty of Medicine, 1879.

Dr. Campbell	$ 100	Forward	$700
Dr. Howard	100	Dr. Ross	50
Dr. Craik	100	Dr. Roddick	50
Dr. MacCallum	100	Dr. Buller	50
Dr. Drake	100	Dr. Gardner	50
Dr. Godfrey	100	Dr. Osler	50
Dr. McEachran, F.R.C.V.S.	100		
Forward	$ 700	Total	$950

Cameron Obstetric Collections.

Dr. J. C. Cameron $10,000

6. Miscellaneous.

Anonymous Donor toward Expenses of Pathology for Session 1892-93 ..... $500

Contributors Towards Salary of Research Fellow in the Department of Pathology, 1900.

James Ross, Esq.	$2,500
R. B. Angus, Esq.	2,500
Total	$5,000

VI. Endowments and Subscriptions for the Faculty of Law.

[1. Endowed] Chairs, Etc.

THE GALE CHAIR, in the Faculty of Law, endowed in 1884 by the late Mrs. Andrew Stuart (*née* Agnes Logan Gale), of Montreal, in memory of her father, the late Hon. Mr. Justice Gale,—$25,000.

THE MACDONALD FACULTY OF LAW ENDOWMENT, founded by Sir Wm. C. Macdonald, in 1890—$150,000. Supplemented in 1897 by $50,000. Total $200,000.

SIR WM. C. MACDONALD, remodelling part of the East Wing in 1895 for Class Rooms, Lecture Rooms, etc., for Law Faculty.

SIR WM. C. MACDONALD, Travelling Scholarships in Law, 1901—$3,600; 1902,—$1,800.

2. Medals,

In 1865 the "Elizabeth Torrance Gold Medal," was founded and endowed by John Torrance, Esq., of St. Antoine Hall, Montreal, in memory of the late Mrs. John Torrance, for the best student in the graduating class in Law, and more especially for the highest proficiency in Roman Law.

VII. Graduates' Funds.

1. The Fund for the Endowment of the Library.

The Graduates' Society of the University, in 1876, passed the following Resolution :—

Resolved :—"That the members and graduates be invited to subscribe to a fund for the endowment of the Libraries of the University; said fund to be invested and the proceeds applied under the supervision of the Council of the Society in annual additions to the Libraries; an equitable division of said proceeds to be made by the Council between the University Library and those of the Professional Faculties."

In terms thereof subscriptions have been paid in to the Graduates' Society, amounting in all to $3,120; the interest on which is annually expended in the purchase of books for the several libraries, under the direction of a special committee appointed for that purpose.

2. The Dawson Fellowship Foundation,

The Graduates' Society of the University, in 1880, and in commemoration of the completion by Dr. Dawson of his twenty-fifth year as Principal, resolved to raise, with the assistance of their friends, a fund towards the Endowment of the Fellowship under the above name.

Details of the scheme can be had from the Treasurer, Francis Topp, B.A., B.C.L. The following subscriptions have been announced to date, Jan. 1st, 1902. They are payable in one sum, in instalments, without interest or with interest till payment of capital as subscribers have elected.

Alphabetically arranged.

Abbott, H., B.C.L.	$ 60
Archibald, H., B.A.Sc.	20
Bethune, M. B., M.A., B.C.L.	50
Carter, C. B., B.C.L.	100
Cruikshank, W. G., B.C.L.	100
Dawson, W. B., M.A., Ma.E.	50
Dougall, J. R., M.A.	250
Gibb, C., B.A.	100
Hall, Rev. Wm., M.A.	100
Hall, J. S., jun., B.A., B.C.L.	100
Harrington, B. J., B.A., Ph.D.	50
Hutchinson, M., B.C.L.	400
Kirby, J., LL.D., D.C.L.	50
Krans, Rev. E. H., M.A., LL.D.	100
Leet, S. P., B.C.L.	100
Lighthall, W. D., M.A., B.C.L.	100
Forward	$1,730
Lyman, H. H., M.A.	100
Lyman, A. C., M.A., B.C.L.	50
McCormick, D., B.C.L.	100
McGibbon, R. D., B.A., B.C.L.	100
McGoun, A., jun., M.A., B.C.L.	50
McLennan, J. S., B.A.	100
Ramsay, R. A., M.A., B.C.L.	50
Spencer, J. W. B.A.Sc., Ph.D.	50
Stephen, C. H., B.C.L.	100
Stewart, D. A., B.A.Sc.	20
Stewart, J., M.D.	60
Tait, M. M., B.C.L.	100
Taylor, A. D., B.A., B.C.L.	100
Trenholme, N. W., M.A., D.C.L.	40
Total to date	$3,110

McGill University

SESSION 1902-1903

DEGREE AND SESSIONAL EXAMINATIONS

LISTS OF STANDING, HONOURS AND PRIZES

CONTENTS

	PAGE
Faculty of Law	3
Faculty of Arts	7
Faculty of Applied Science	20
Faculty of Medicine	41

Faculty of Law.

THIRD YEAR (GRADUATING CLASS).

HONOURS.

(In order of merit. Students of equal standing are bracketed together.)

GOSSELIN, LOUIS, B.A.—First Rank Honours, Elizabeth Torrance Gold Medal and Prize of $50.
CASGRAIN, A. CHASE, B.A.—Second Rank Honours and Prize of $25.
MACKINNON, CECIL G., B.A.—Second Rank Honours and Prize of $15.

PASSED FOR THE DEGREE OF B.C.L.

(In order of merit.)

Gosselin, Louis, B.A.
Casgrain, A. Chase, B.A.
MacKinnon, Cecil G., B.A.
Rugg, Frederick S.
Vipond, Herbert S.
Madore, Louis, B.A.
Theberge, Albert.
Blaylock, Harry W., B.A.
Bergeron, Patrick John.
Tansey, Thomas M.
Orr, Henry Stanley, B.A.
Weinfield, Henry, B.A.
Rankin, Arthur G. E., B.A.

STANDING IN THE SEVERAL SUBJECTS

(Subjects alphabetically arranged.)

AGENCY, PARTNERSHIP AND CORPORATIONS.

Theberge and Vipond and Madore, equal; Gosselin, Weinfield, Casgrain, Rugg, Bergeron, Rankin, Tansey; Blaylock and MacKinnon, equal; Orr.

COMMERCIAL LAW.

Casgrain, Rugg, Theberge, Blaylock, MacKinnon; Tansey and Gosselin, equal; Bergeron, Vipond, Madore, Orr, Weinfield, Rankin.

CONSTITUTIONAL LAW.

MacKinnon; Rugg and Vipond, equal; Weinfield, Blaylock, Bergeron, Orr, Rankin; Theberge and Gosselin, equal; Madore, Casgrain, Tansey.

CRIMINAL LAW.

Casgrain; Madore and Tansey, equal; Rugg and Theberge, equal; Bergeron, MacKinnon, Gosselin; Blaylock and Orr, equal; Vipond, Rankin, Weinfield.

INTERNATIONAL LAW.

Vipond, Tansey, Casgrain, Orr; Theberge and Gosselin, equal; MacKinnon, Madore, Weinfield, Rugg, Blaylock, Bergeron, Rankin.

MARRIAGE COVENANTS, PRESCRIPTION, ETC .

Gosselin, Rugg, Bergeron, Blaylock, Theberge, Vipond, MacKinnon, Madore, Orr, Casgrain, Weinfield, Tansey, Rankin.

OBLIGATIONS.

Gosselin, Orr; Casgrain and Madore, equal; MacKinnon and Vipond, equal; Blaylock, Rugg; Rankin and Theberge, equal; Weinfield and Bergeron, equal; Tansey.

PROCEDURE.

Gosselin, MacKinnon, Rugg, Weinfield, Bergeron; Blaylock and Casgrain and Vipond and Rankin, equal; Tansey; Theberge and Madore, equal; Orr.

REAL PROPERTY LAW.

Theberge, Bergeron; MacKinnon and Vipond, equal; Madore, Casgrain; Gosselin and Tansey, equal; Orr; Blaylock and Rugg, equal; Weinfield, Rankin.

ROMAN LAW.

Gosselin and MacKinnon, equal; Madore and Casgrain, equal; Blaylock, Orr, Bergeron, Vipond; Rugg and Theberge, equal; Tansey, Rankin, Weinfield.

SUCCESSIONS, GIFTS AND SUBSTITUTIONS.

Casgrain and Vipond, equal; Orr; Blaylock and Madore and Rugg, equal; Bergeron and Tansey and Rankin, equal; Gosselin, Theberge, MacKinnon, Weinfield.

SECOND YEAR.

HONOURS.

DICKSON, N.—First Rank General Standing and Prize of $50.
WILLIAMS. H. S., B.A.—First Rank General Standing and Prize of $25.
COTTON, W. N., B.A.—First Rank General Standing.
DROUIN, J.—First Rank General Standing.

PASSED THE SESSIONAL EXAMINATION.

(In order of merit).

Dickson, Williams, Cotton, Drouin, Brodie, Phelan, McDougall, DeWitt, Ogilvie, Pope, Vineberg, Mackie, Stephens.

STANDING IN THE SEVERAL SUBJECTS.

(Subjects alphabetically arranged.)

CIVIL PROCEDURE.

Dickson; Phelan and Williams, equal; Brodie and Cotton, equal; McDougall; Mackie and Stephens and Drouin, equal; Ogilvie and DeWitt equal; Pope and Vineberg, equal.

COMMERCIAL LAW.

Dickson, Williams, Drouin, Phelan, Cotton, Brodie and McDougall, equal; DeWitt, Vineberg; Mackie and Pope, equal; Ogilvie.

CORPORATIONS.

Cotton, Dickson, Williams, Drouin, Brodie, Phelan, McDougall, De Witt, Ogilvie; Pope and Vineberg, equal; Stephens, Mackie.

CRIMINAL LAW.

Cotton, Williams, Dickson, Pope; Brodie and Drouin, equal; Ogilvie Phelan, De Witt, McDougall, Stephens, Mackie, Vineberg.

INTERNATIONAL LAW.

Drouin, Dickson, Cotton, McDougall, Williams, Brodie, De Witt, Ogilvie and Phelan, equal; Vineberg, Pope, Mackie and Stephens, equal.

PRESCRIPTION, LEASE OR HIRE, MUNICIPAL LAW.

Dickson, Drouin, Williams, De Witt, Brodie, McDougall, Cotton Mackie, Phelan, Vineberg, Stevens, Pope and Ogilvie.

REAL PROPERTY LAW.

Dickson, Williams, Drouin, Cotton, Brodie, Phelan, Ogilvie, Vineberg McDougall, Mackie, Pope, Stephens, De Witt.

SUCCESSIONS.

Brodie and Cotton, equal; Drouin; Dickson and Ogilvie, equal; Williams, Pope, Vineberg, McDougall, Phelan, De Witt, Mackie, Stephens.

FIRST YEAR.

HONOURS.

HARRIS, SPENCER DALE, B.A.—First Rank General Standing and Scholarship of $100.

PASSED THE SESSIONAL EXAMINATION.

(In order of merit.)

Harris, Spencer, Dale, BA.; Greenshields, Charles G.; Coulin, James E.; Wallace, Richard P.; Morin, S. R., B.A.; Duffy, Fabian J.

STANDING IN THE SEVERAL SUBJECTS.

(Subjects alphabetically arranged.)

CIVIL PROCEDURE.

Harris, Greenshields, Coulin, Duffy, Wallace, Morin.

CONSTITUTIONAL LAW.

Harris, Wallace; Morin and Coulin, equal; Greenshields, Duffy.

LEGAL HISTORY.

Harris, Coulin, Greenshields, Wallace, Morin, Duffy.

OBLIGATIONS.

Harris and Greenshields, equal; Morin and Coulin, equal; Wallace and Duffy, equal.

PERSONS.

Greenshields, Coulin, Harris; Morin and Wallace, equal; Duffy.

REAL RIGHTS.

Harris; Morin and Greenshields, equal; Wallace, Duffy, Coulin.

ROMAN LAW.

Harris Coulin, Greenshields, Wallace, Morin, Duffy

Faculty of Arts.

PASSED FOR THE DEGREE OF B.A.

IN HONOURS.

(In Alphabetical Order.)

First Rank. —Belyea, Marion E.
Bovey, F. H. Wilfrid.
Couture, Gui. C.
East, Edith M.
Johnson, Walter S.
Lomer, Gerhard R.
Lundie, E. Helen
Parkin, Maude E.
Wales, Julia G.

Second Rank.—Fee, Jas. E.
Lockhart, Arthur R. B.
Wisdom, Katherine F.

ORDINARY B.A.

(In order of merit. Students of equal standing are bracketed together).

Class I.—Davidson, Mac. B.
McMorran, Thomas S.

Class II.—Griffin, Gertrude
Harris. Alan Dale
Dutaud, Gustave
{ Lunny, Rosemary
{ Parkins, Edgar R.
{ Cameron, Dakers
{ Mackay, Eric B.
Seaman, Jno. C.
{ Holman, William L.
{ Troop, George W. H.

Class III.—Simister. Warren.
Ascah, Robert G.

SPECIAL EXAMINATION.

Ireland, F. Charles
Parker, Dan T.

ORDINARY B. SC.

Class II.—Gass, Helen
Class III.—McLeod, Euphemia G.

THE NEIL STEWART PRIZE.

Reid, Allan S., B.A.

BACHELORS OF ARTS PROCEEDING TO THE DEGREE OF M.A. IN COURSE.

Cooke, Hereward Lester, B.A.
Craig, William Woodham, B.A.
Johnson, John Guy Watts, B.A.
McMillan, Cyrus J., B.A.

BACHELOR OF ARTS PROCEEDING TO THE DEGREE OF M.SC. IN COURSE.

Marcuse, Bella, B.A.

MASTER OF ARTS PROCEEDING TO THE DEGREE OF D.SC. IN COURSE.

Tory, Henry M. J., M.A.

ADMITTED TO THE DEGREE OF LL.D., HONORIS CAUSA.

Mackenzie, Sir Alexander Campbell, Mus.Doc., LL.D. (Glasgow).
Moyse, Charles E., B.A. (London).
Parkin, George R., LL.D., C.M.G.

PASSED THE INTERMEDIATE EXAMINATION.

(1).—FOR COURSE LEADING TO B.A.

(In order of merit. Students of equal standing are bracketed together.

Class I.—King, Louis V.
Idler, S. Mary
Michaels, Rosebud F.
Macnab, Norman

Class II.—Cushing, R. Macaulay
Sharp, Florence E.
Chodat, Henri
Taber, Marion M. D.
Fraser, Geo. A.
Smith, May
Edwards, Lyford P.
McFee, M. C. Coll
Bowman, Nora F.
Curtis, Walter E.
Perry, Kenneth M.
Roy, Philias R.

Class III.—Halpenny, Thomas A.
Hitchcock, Mary A.
Laverock, ‡ Lily J.
Adams, Claude A.
Hill, Julia M.
McCuaig, Douglas R.
McMurtry, Rennie O.
Nicholson, John C.
Moule, Frances S.
Cameron, A. W.
Lyman, Ruth D.
Wales, Osgood H.
Gillean, A. Muriel
Hyde, G. Gordon
Stewart, William
Stewart, Thomas S.

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‡ Vancouver College.
s With supplemental examination in one subject.

Bajus, William P. (*s*) ‡
Cotton, Thomas F. (*s*)
Crane, C. W. (*s*)
Cross, C. Ernest (*s*)
DeBeck, Edwin K. ‡ (*s*).
Hepburn, Flora E. (*s*).
Howitt, Henry (*s*).
Jenkins, Joseph (*s*).
Locke, Ernest (*s*).
McCoy, Isabel (*s*).
Munn, Laura A. (*s*).
Ower, John J. (*s*).
Price, Thomas John ‡ (*s*).
Rabinovitch Max (*s*).
Robinson, William W. (*s*).
Smith, Ella (*s*).
Tannenbaum, David (*s*).

FOURTH YEAR (GRADUATING CLASS).

HONOURS.

In Mathematics and Natural Philosophy.

LUNDIE, E. HELEN—First Rank Honours and Anne Molson Gold Medal

In Classics.

BOVEY, F. H. WILFRID—First Rank Honours and Chapman Gold Medal.

In Mental and Moral Philosophy.

EAST, EDITH M.—First Rank Honours and Prince of Wales Gold Medal.
LOMER, GERHARD R.—First Rank Honours and Medal Prize.
LOCKHART, ARTHUR R. B.—Second Rank Honours.
FEE, JAMES E.—Second Rank Honours.

In English Language and Literature.

WALES, JULIA G.—First Rank Honours and Shakspere Gold Medal.
BELYEA, MARION E.—First Rank Honours.
JOHNSON, WALTER S.—First Rank Honours.

In Modern Languages and History.

WISDOM, KATHERINE F.—Second Rank Honours.

*In History.**

COUTURE, GUI. C.—First Rank Honours and Medal Prize.
PARKIN, MAUDE E.—First Rank Honours.

First Rank General Standing.

DAVIDSON, MAC. B.—Special Certificate.
MCMORRAN, THOMAS S.—Special Certificate.

THIRD YEAR.

HONOURS.

SHELDON, ERNEST W.—First Rank Honours and Prize in Mathematics and Natural Philosophy.
ROSE, HERBERT J.—First Rank Honours in Classics; Prize in Latin; Prize in Greek.
ARCHIBALD JOHN G.—First Rank Honours in Classics; Prize in Latin.

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‡ Vancouver College.
s With supplemental examination in one subject.
*No medal offered for this subject.

HINDLEY, J. GEO.—First Rank Honours and Prize in History and Economics.
CAMPBELL, DONALD G.—First Rank Honours and Prize in History and Economics.
HADRILL, MARGARET.—First Rank Honours in History and Economics; Prize in Economics.
SHANKS, GEO.—First Rank Honours in Mineralogy.
BROWN, WM. G.—First Rank Honours and Prize in Chemistry.
LATHE, FRANK E.—First Rank Honours in Chemistry.
MCLEOD, ANNIE.—First Rank Honours in Chemistry.
HART, E. MURIEL.—First Rank Honours in English Language and Literature.
SIMPSON, EDITH B.—Second Rank Honours and Prize in Mathematics and Natural Philosphy.
MACKENZIE, CATHERINE I.—Second Rank Honours in History and Economics; Prize in History.
RUBINOWITZ, ISRAEL.—Second Rank Honours in History and Economics.
GRIFFIN, GRACE L.—Second Rank Honours in History and Economics.
FREEZE, HELEN L.—Second Rank Honours in Chemistry.
GARDNER, H. IVY L.—Second Rank Honours in English Language and Literature.
DICKSON, ADA.—Second Rank Honours in English Language and Literature.
MCKENZIE, ANGUS D. M.—Second Rank Honours in History and Economics.
MCGOUGAN, ED.—Second Rank Honours in Philosophy.
MCCALLY, M. V.—Second Rank Honours in Modern Languages.
LOMER, Theo. O.—Prize in Modern Languages.
STEWART, J. URE.—Prize in Hebrew.

PASSED THE THIRD YEAR EXAMINATIONS.

(Arranged in alphabetical order.)

Archibald, Bell, Bouchard, Brown, Campbell, Craig, Dickenson, Dickson, Draper, Freeze, Gardner, Griffin, Hadrill, Hart, Harvie, Henry, Hindley, Lathe, Logan, McCally, McDonald, MacFarlane, McGougan, Mackenzie (C.I.), McKenzie (A.D.), MacLeod, Marshall, Mingie, Molson, Papineau, Robertson, Rose, Rubinowitz, Shanks, Sheldon, Simpson, Stewart (J.U.), Stewart (L.J.), Walker, Wickware, Wilson.

Students in Arts, registered in Medical Faculty, who will be qualified to enter the fourth year Arts on completing their medical year:

Chandler, Gray, Gurd, Lomer, McDiarmid.

SECOND YEAR.

HONOURS.

KING, LOUIS V. (Montreal High School)—First Rank Honours and Prize in Mathematics; First Rank Honours and Prize in Latin, First Rank General Standing.
IDLER. S. MAY (Montreal High School)—First Rank Honours and Prize in Latin; Second Rank Honours in Mathematics; First Rank General Standing; Prize in Philosophy; Prize in German; Annie McIntosh Prize.
PERRY, Kenneth M. (Regina High School)—First Rank Honours and Prize in Mathematics.
CUSHING, R. Mac. (Montreal High School)—First Rank Honours and Prize in Latin.
EDWARDS, L. P. (Central High School, Grand Rapids, Mich.)—Second Rank Honours in Latin.
FRASER, GEO. A. (Montreal High School)—Second Rank Honours in Latin.
SMITH, MAY (High Schbol, Montreal)—Second Rank Honours in Latin.
HITCHCOCK, MARY E. (Stanstead Wes. Coll.)—Second Rank Honours in Philosophy.

MICHAELS, R. F. (High School, Montreal)—First Rank General Standing.
MACNAB, NORMAN (Montreal High School)—First Rank General Standing.
CHODAT, HENRI (Montreal High School)—Prize in Modern Languages.
HALPENNY, T. ANSON (Montreal High School)—Prize in Biology.
SHARP, F. EVELYN (Private Tuition)—Prize in Logic. Prize in English.
TABER, MARION, M.D. (Stanstead Wes. Coll.)—Prize in Botany.
ROY, P. R.—Prize in Hebrew.

PASSED THE SESSIONAL EXAMINATIONS.

(1) FOR COURSE LEADING TO B.A.

Class I.—King, Idler, Michaels, McNab.
Class II.—Cushing, Chodat and Taber, equal; Fraser (G.A.) and Smith, May, equal; Edwards, McFee; Bowman and Curtis and Perry and Roy, equal.
Class III.—Halpenny, Hitchcock, Laverock ‡; Adams and Hill and McCuaig, equal; McMurtry and Nicholson, equal; Moule, Cameron; Lyman and Wales, equal; Gillean; Hyde and Stewart W., equal; Stewart, T. S., Bajus ‡ (*s*), Cotton (*s*), Crane (*s*), Cross (*s*), DeBeck ‡ (*s*), Hepburn (*s*), Howitt (*s*), Jenkins (*s*), Locke (*s*), Munn (*s*), Ower (*s*), Price ‡ (*s*), Rabinovitch (*s*), Robinson, W. W. (*s*), Smith Ella (*s*), Tannenbaum (*s*).

(2) FOR COURSE LEADING TO B.SC.

Class II.—Sharp.
Class III.—McCoy (*s*).

FIRST YEAR.

HONOURS.

MCLEOD, ALEX. R. (Prince of Wales College, Charlottown, P.E.I.)—First Rank Honours in Latin; Second Rank Honours in Mathematics; First Rank General Standing; Prize in Latin; Prize in Greek; Coster Memorial Prize.
CARR, WM. L. (Huntingdon Academy)—First Rank Honours and Prize in Mathematics.
KIRSCH, SIMON, (Montreal High School)—First Rank Honours in Mathematics; Second Rank Honours in Latin.
ROGERS, DAVID B.—First Rank Honours in Mathematics.
COUSINS, GEO. V. (Westmount Academy)—First Rank Honours in Latin.
RORKE, MABLE—Second Rank Honours in Mathematics.
NAYLOR, R. KENNETH (Shawville Academy)—Second Rank Honours in Latin.
GIBB, Robertson W. (Westmount Academy)—Second Rank Honours in Latin.
VINEBERG, SOLOMON (Sherbrooke Academy)—Second Rank Honours in Latin.
{LEWIS, DAVID S. (Montreal High School)—First Rank General Standing.
{SHAW, HERBERT T. (Montreal High School)—First Rank General Standing; Prize in English.
RYAN, ESTHER L. M. (Montreal High School)—Second Rank Honours in Latin; Prize in French.

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‡ *Vancouver College.*
(*s*) *Supplemental in one subject.*

PASSED THE SESSIONAL EXAMINATIONS.

(In alphabetical order.)

(1).—FOR COURSE LEADING TO B.A.

McLeod; Lewis and Shaw, equal; Kirsch, Holway; Naylor and Ryan, equal; Carr; Flanders † and Freedman and McTaggart ‡ and Rorke, equal; Gibb; Clark and Cousins and Douglas, equal; Vineberg; Scott and Smith ‡ and Tully, equal; Griffin and Ross, equal; Lyman; Fraser and Phelps † and Rogers, equal; Payne, Mundie, Barclay and Henry, equal; Mowatt, Newman, Brydone-Jack † (*s*), Drew (*s*), Edwards † (*s*), Gillmor (*s*), Housser (*s*), Martin (*s*), McCallum (*s*), McQueen ‡ (*s*), Massey (*s*), Shearer (*s*), Sutherland (*s*).

(2).—FOR COURSE LEADING TO B.SC.

Waugh (*s*).

STANDING IN THE SEVERAL SUBJECTS.

(Subjects alphabetically arranged.)

FOURTH YEAR (GRADUATING CLASS).

ART AND ARCHAEOLOGY.

Class I.—Walker, Harris. *Class II.*—Couture.

BOTANY.

Class I.—Gass. *Class II.*—McLeod.

CHEMISTRY (ORGANIC).

Class III.—Fripp.

CONSTITUTIONAL LAW.

Class I.—McMorran.

COMPARATIVE PHILOLOGY.

Class I.—Bovey. *Class II.*—Wisdom. *Class III.*—Pearson (K.C.), B.A.

ENGLISH COMPOSITION.

Class I.—Belyea, Johnson, Wales, Davidson. *Class II.*—Lunny, McMorran, Griffin, Simister. *Class III.*—Troop, Harris, Parkins, Holman, Cameron, Dutaud, McKay; Seaman and Ascah, equal; Fripp.

ENGLISH LITERATURE: POETS OF THE 19TH CENTURY.

Class I.—Davidson, Wales, Belyea, Johnson. *Class II.*—Dutaud, Holman, Troop, Parkins. *Class III.*—Simister.

ENGLISH LITERATURE: PROSE FICTION.

Class I.—Belyea, Johnson, Wales, Davidson. *Class II.*—Simister, Parkins, Dutaud, Troop, Fripp.

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† *Stanstead College.*
‡ *Vancouver College.*
(*s*) *Supplemental in one subject.*

ENGLISH: EIGHTEENTH CENTURY LITERATURE.

Class I.—Lunny. *Class III.*—Ascah.

ENGLISH: THE ELIZABETHAN DRAMATISTS.

Class I.—Lunny. *Class II.*—Holman. *Class III.*—Ascah.

FRENCH.

Class I.—Dutaud, Wisdom. *Class II.*—Lunny.

GERMAN.

Class I.—Wisdom. *Class II.*—Lunny, Griffin.

GEOLOGY.

Class I.—Davidson, Griffin. *Class II.*—Seaman, Mackay, Gass, Troop, *Class III.*—Parkins, Dutaud, McLeod.

GREEK.

Class I.—Bovey. *Class II.*—Pearson (K.C.), B.A.

HEBREW.

Class I.—Mackay, Seaman.

HISTORY OF MODERN PHILOSOPHY.

Class I.—East, Lomer, Cameron. *Class II.*—Lockhart, Fee.

HISTORY.

Class I.—Harris. *Class III.*—Simister.

LATIN.

Class I.—Bovey.

MORAL PHILOSOPHY.

Class I.—East, Lomer, Fee, Lockhart. *Class II.*—Cameron, Troop, Mackay.

METAPHYSICS.

Class II.—Ascah, Seaman.

PHYSICS.

Class I.—Lundie, Harris.

POLITICAL SCIENCE.

Class I.—Davidson, McMorran. *Class II.*—Griffin, Holman. *Class III.*—Cameron, Fripp.

POLITICAL ECONOMY.

Class II.—Parkins. *Class III.*—Ascah, Simister.

ROMAN LAW.

Class I.—McMorran.

ZOOLOGY.

Class I.—Holman. *Class II.*—McDiarmid.

THIRD YEAR.

ART AND ARCHAEOLOGY.

Class II.—Draper.

BOTANY.

Class II.—MacFarlane.

CHEMISTRY.

Class I.—Shanks. *Class II.*—Marshall, Walker. *Class III.*—Fripp.

COMPARATIVE PHILOLOGY.

Class I.—Archibald, Rose. *Class II.*—Henry (A.E.E.) and McCally, equal.

ENGLISH COMPOSITION.

Class I.—Lomer; Logan and Bouchard and MacFarlane, equal. *Class II.*—Papineau; McDiarmid and Stewart J. (U.) and Henry and Wickware, equal; Wilson, Dickson; Hart and Gardner and Dickenson, equal; Gray and McDonald, equal; Mingie; Draper and Robertson and Kimber, equal. *Class III.*—Craig; Chandler and Molson, equal; Walker, Bell, Marshall, Stewart, Gurd, Harvie.

ENGLISH: EIGHTEENTH CENTURY LITERATURE.

Class I.—Lomer, Hart. *Class II.*—Gardner and Dickson, equal; Logan, Bouchard, Marshall. *Class III.*—Craig, Mingie.

ENGLISH: THE ELIZABETHAN DRAMATISTS.

Class I.—Walker, Draper, Lomer, Hart; Gardner and Papineau, equal; Dickson, McDonald. *Class II.*—Stewart, Henry. *Class III.*—Logan, Craig, Bouchard; Marshall and Molson, equal; Mingie, Kimber.

ENGLISH LITERATURE: POETS OF THE 19TH CENTURY.

Class I.—Walker, Stewart. *Class II.*—Draper, McDonald, Papineau, Henry. *Class III.*—Molson, Fripp.

FRENCH.

Class I.—Lomer, Simpson. *Class II.*—McCally, Henry, Draper, Wilson. *Class III.*—Robertson, Craig.

GEOLOGY.

Class I.—Freeze, Brown, Shanks. *Class II.*—Lathe, Draper and Mackay, equal; Mingie, Walker. *Class III.*—Stewart.

GERMAN.

Class II.—Gardner and McCally, equal; Henry, Robertson. *Class III.*—Dickson, Bell, Bouchard, Kimber.

GREEK.

Class I.—Rose (prize), Archibald. *Class III.*—Wilson.

HEBREW.

Class I.—Stewart (prize).

HISTORY.

Class I.—Walker, Mackenzie, C. I. (prize), Campbell, McDonald; Griffin and Hadrill, equal; Papineau and Stewart, equal. *Class II.*—Hindley, McKenzie (A. D.), Rubinowitz, MacFarlane, Molson, Ellison, Logan. *Class III.*—Bell and Dickenson, equal.

LATIN.

Class I.—Archibald (prize), and Rose (prize), equal; Hart. *Class II.*—Bouchard, Bell, Craig, and Wilson, equal; Robertson. *Class III.*—McCally.

MORAL PHILOSOPHY.

Class II.—Chandler; Gurd and Mingie, equal; Gray. *Class III.*—May, Ross.

METAPHYSICS.

Class II.—McGougan. *Class III.*—Logan, Stewart.

MECHANICS AND HYDROSTATICS.

Class I.—Sheldon. *Class III.*—Simpson, Stewart.

PHYSICS (EXPERIMENTAL.)

Class I.—Lathe, Sheldon, Brown, Freeze, Simpson. *Class II.*—Marshall. *Class III.*—MacLeod.

Honours in Mathematics and Natural Philosophy.

First Rank:—Sheldon, E. W. (prize).
Second Rank:—Simpson, Edith P. (prize).

POLITICAL ECONOMY.

Class I.—Hadrill (prize), Hindley, Griffin, McKenzie, A. D. *Class II.*—McDonald, Mackenzie, C. I., Campbell, Rubinowitz, Molson.

POLITICAL SCIENCE.

Class I.—Hindley (prize). *Class II.*—Campbell, McKenzie, Rubinowitz, Hadrill, Papineau, Griffin, Wickware, Mackenzie, Gurd, Chandler. *Class III.*—Walker, McGougan, Harvie, Dickenson.

ZOOLOGY.

Class I.—MacFarlane and Shanks, equal.

SECOND YEAR.

BIOLOGY (ELEMENTARY.)

Class I.—Halpenny and Taber (Prizes), equal. *Class II.*—Fraser, Sharpe, McNab; Lyman and Ower, equal; Locke; Edwards and McCoy, equal; Curtis, Howitt, Cross, Armstrong, Cotton, Nicholson, Tannenbaum.

BIOLOGY (CONTINUATION COURSE.)

Class III.—Wright.

CHEMISTRY.

Class I.—King, McNab. *Class II.*—Curtis and Fraser and Perry, equal; Michaels and Sharpe, equal; Cameron and Cushing and McCoy and McFee, equal. *Class III.*—Gillean and Hill and Fraser and Fetherstonhaugh and Locke and Wright, equal; Cross and McMurtry and Manley and Rabinovitch and Robinson and Ross and Stewart, equal; Cotton and Dawson and Howitt and Lyman and Nicholson and Ower and Tannenbaum, equal; Hyde and Pearson, equal; Graham.

ENGLISH.

Class I.—Sharp (prize), Idler, King, Taber, McNabb, Laverock.‡ *Class II.*—Blanchard and Bowman and Cushing and Michaels, equal; Smith, (M.), Price,‡ Milne,‡ Curtis, Howitt, Bajus,‡ McCuaig, Hitchcock, Pearson, Edwards, Montgomery, Hill, Robinson (W.), Fraser (G.), Adams, Moule, McFee. *Class III.*—Chodat, Halpenny, Gilmour, Roy, Cameron, Donaldson,‡ Robinson (F. G.), Wright, Ross, Graham, Fraser (A.), Nicholson, Tannenbaum, Stewart (T.), Jackson, DeBeck,‡ McMurtry, Stewart (T.), Manley, Mackay, Jenkins, Smith (E. L.), Cotton, Dawson, Rabinovitch, Munn, Perry, McCoy, Locke, Foote, Lyman, Crane, Ower, Hepburn, Gillean, Fetherstonhaugh, Hyde, Morgan, Cousineau, Wales.

FRENCH.

Class I.—Chodat; Idler and Michaels, equal; King, Smith (M.), Sharpe. *Class II.*—Roy, Adams, Perry; Fraser and McFee, equal; Cushing, Prendergast, Bowman; Blanchard and Clogg, equal. *Class III.*—Dey and McMurtry, equal; Cameron and McCuaig, equal; Healy; Hepburn and Munn, equal; Moule; Cotton and Hill, equal; Tannenbaum and Hitchcock, equal; Robinson and Stewart and Fraser, equal; Hyde, Jenkins, Bajus‡; Gillean and McCoy, equal; De Beck‡, Pearson, Wales; Locke and Stewart, equal; Cousineau.

GERMAN.

Class I.—Idler, Michaels. *Class II.*—Binks, Chodat, Rabinovitch, Smith (J), Laverock‡. *Class III.*—Smith (M.), Sharpe.

GREEK.

Class I.—Smith (E.). *Class II.*—Nicholson and Taber and McCuaig and Edwards, equal; Hepburn. *Class III.*—Cross, Halpenny, Crane, Wales.

HEBREW.

Class I.—Lancaster and Joliat, equal. *Class II.*—Ormiston, Raymond (B.A.), Roy (prize), Halpenny, Cross, Manley, Laverock.‡

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‡ *Vancouver College.*

LATIN.

Class I.—King, Idler, Cushing, Fraser, Michaels, Edwards and Smith, equal. *Class II.*—Munn; Curtis and Rabinovitch, equal; Smith, Wales, Blanchard, McNab, Taber, Perry, Price,‡ Hill, Roy; Chodat and Hepburn and Hitchcock, equal; Laverock.‡ *Class III.*—Gillean, Adams, Hyde, Bowman; Manley and McFee, equal; Moule, McMurtry; Jenkins and Lyman, equal; Cameron and Bajus,‡ equal; DeBeck,‡ Donaldson,‡ Ower, Dawson; Crane and Healy and Stewart (W.), equal; Stewart (T.).

LOGIC.

Class I.—Idler and Sharpe, equal (prizes); Macnab, Cushing. *Class II.*—Hitchcock, McMurtry, Taber, Bowman; Howitt and Montgomery, equal; Crane. *Class III.*—Curtis and Lyman and Roy, equal; Hill; Moule and Smith, equal; Milne,‡ Smith; Edwards and Nicholson, equal; Laverock,‡ Fraser and Stewart (W.), equal; Halpenny and Foote, equal; Munn, Cameron, Hyde; Graham and Price‡ and Stewart, equal.

MATHEMATICS.

(1). Spherical Trigonometry and Algebra.

Class I.—King, Wales, McFee, Chodat, Bowman. *Class II.*—Perry, Ross. *Class III.*—Hitchcock and Bajus‡ and Donaldson,‡ equal; Robinson, Price;‡ McCuaig and Smith, equal; DeBeck,‡ Healy, Moule, Gillean; Milne and Jenkins, equal; Munn.

(2). Solid Geometry, Conic Sections, Dynamics.

Class I.—King, Price,‡ Perry. *Class II.*—Robinson; DeBeck‡ and Milne,‡ equal; McFee, Chodat, McCuaig; Bowman and Smith (M.), equal; Adams. *Class III.*—Donaldson, Healy; Cushing and Braidwood, equal; Bajus.‡ Ross and Gillean, equal; Hitchcock, Moule, Tupper; Jenkins and Hepburn, equal; Wales.

(3). Advanced Section.

First Rank Honours.—King, Perry.
Second Rank Honours—Idler.

FIRST YEAR.

ENGLISH.

Class I.—Shaw (prize), Lewis, Gibb, McLeod, McCallum, Barclay, McTaggart,‡ Cousins, Robertson, Rorke, McQueen,‡ Flanders.† *Class II.*—Ryan, Payne; Tully and Douglas, equal; Kirsch, Vineburg, McPhalen,‡ Naylor, Thomson, Newman, Rogers, Clarke, Phelps,† Freedman, Housser, Ross, Blakemore. *Class III.*—Gillmor and Carr, equal; Anstie,‡ Crocker, Henry, Griffin, Fraser, Brydon-Jack,‡ Mowatt; Drew and Trench, equal; Fitz-Gibbon, Lyman, Mundie, Stafford, Holway, Healy; Martin and Marcuse, equal; Ellis,‡ Massee, Smith,‡ Kiely, Scott, Sutherland, Vassie, Cordner, Edwards,† Peas, Patrick, Shearer, Stanton.†

LITERATURE AND HISTORY.

Class I.—Peterson.

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‡ *Vancouver College.*
† *Stanstead College.*

FRENCH.

Class I.—Ryan; Douglas and Vineburg and Gibb, equal; Freedman, Kirsch. *Class II.*—Gillmor, Lewis; Robertson and Rorke, equal; Blakemore, Clark, Shaw; Smith and Cousins, equal; McTaggart,‡ Phelps,‡ Carr; Fraser and Scott, equal; Flanders† and McQueen,‡ equal; Griffin, Lyman. *Class III.*—Barclay and Henry and Naylor, equal; Stanton† (G.) and Williams, equal; Smith and Ross, equal; Langley and Waugh, equal; Mitchell, Mowatt; Haskell and Payne and Trench, equal; McCallum and Tully, equal; Sutherland, Newman; McPhalen‡ and Garvin, equal; Thomson, Mundie, Massey.

GERMAN.

Class I.—Holway. *Class II.*—Ryan; Clark and Douglas, equal; Rorke, Stanton.† *Class III.*—Fraser, Griffin.

GERMAN (BEGINNERS.)

Class II.—Kirsch. *Class III.* — Bowman, Armstrong, Lewis, Trench, Vineburg, Waugh.

GREEK.

Class I.—McLeod (prize), Naylor, Freedman, Gibb. *Class II.*—Shearer; Housser and McCann, equal. *Class III.*—Drew, Rogers, Martin, Thomson, Edwards†.

LATIN.

Class I.—*McLeod (prize), Naylor, Cousins, Flanders;† Kirsch and Douglas, equal; Vineburg, Gibb; Holway and Housser and McTaggart‡ and Ryan, equal. *Class II.*—Clark, Smith; Freedman and McQueen,‡ equal; Lewis, Shaw, Shearer, Drew, Carr, Ross; Fraser and Lyman, equal; Edwards and McCallum and Scott, equal; Phelps. *Class III.* —Henry, Tully, Brydon-Jack;‡ Langley and Rogers, equal; Rorke; Anstie‡ and Barclay and Braidwood, equal; Davidson and Stanton† and Stanton,† equal; Mundie; McCann and Payne, equa Griffin and Martin, equal; Gillmor and Loat,‡ equal; Massey; Carter and Williams, equal; Mowatt and Newman, equal; Hendry.

GEOMETRY AND ARITHMETIC.

Class I.—Shaw, McLeod, Ellis, Loat.‡ *Class II.*—Lewis; Kirsch and Crocker, equal; Holway and Healy, equal; Williams; Cousins and Rogers and Brydon-Jack,‡ equal; Waugh; Carr and Howe and Griffin, equal; Pease, Ross; Housser and Sutherland and Patrick and Clark and Rorke, equal; Naylor; Tully and Smith,‡ equal. *Class III.*—Silcox; Scott and Ryan, equal; Flanders;† Gibb and Stanton,† equal; Hendry and Kiely, equal; Freedman and Mundie and McCallum, equal; Shearer; Drew and Lyman, equal; Phillips and McQueen‡ and Davidson, equal; McTaggart,‡ Barclay; Henry and Douglas, equal; Marcuse and Stafford and Gale and Payne and Chapman, equal; Hutchinson and Vineburg and Stackhouse and Thomson and Fraser, equal; Garvin; Newman and Massey and Phelps,‡ equal; Copeland, Edwards,† Gillmor, Mowatt, Anstie‡.

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* Mark of Distinction.

† *Stanstead College.*

‡ *Vancouver College.*

TRIGONOMETRY AND ALGEBRA.

Class I.—Lewis, Rorke. *Class II.*—Shaw, Ryan, Carr; Naylor and Crocker, equal; Holway; Scott and Flanders,† equal; Clark; Freedman and Douglas, equal; Ellis and Loat,‡ equal; Griffin; McLeod and Phelps, † equal; Garvin and Healy and Mowatt, equal; Gibb. *Class III.*—Mundie and Silcox, equal; Davidson, Mather; Gale and Fraser and Smith‡, equal; Kirsch and Gillmor, equal; Tully and Langley, equal; Drew and Rogers, equal; Lyman; Hendry and Waugh and Payne, equal; Shearer; Brydon-Jack‡ and McTaggart‡ and Hutchinson and Marcuse and Ross and Vassie and Williams, equal; Kiely; Stafford and Howe, equal; Barclay and Pease and Sutherland, equal; Stanton† and Anstie,‡ equal; Chapman, Henry, Cousins, Newman.

ADVANGED SECTION, MATHEMATICS.

First Rank Honours.—Carr, Kirsch, Rogers.
Second Rank Honours.—Rorke, McLeod.

PHYSICS.

Class I.—Carr; Lewis and Shaw, equal; Kirsch; McTaggart‡ and McQueen,‡ equal; Cox, McLeod, Rogers, Healy, Holway. *Class II.*—Crocker and Kiely, equal; Brydon-Jack ‡ Smith ‡ Ryan; Housser and Lyman and McCallum, equal; Barrett and Douglas and Flanders, † and Freedman and Tully, equal; Naylor, Rorke. *Class III.*—Langley‡; Griffin and Payne, equal; Ross and Scott, equal; Clark and Silcox, equal; Cousins and Pease, equal; Hutchinson and Shearer, equal; Mundie and Vineburg and Waugh, equal; Blakemore and Gibb and Sutherland, equal; Hendry; Henry and Marcuse and Stackhouse, equal; Johnston and Stanton,† equal; Kennedy and Martin, equal; Gale; Fraser and Newman and Phelps,† equal; Garvin, Stanton,† McCann, Barclay, Edwards†; Chapman and Trench, equal; Massey and Stafford, equal; Mowatt.

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‡ *Vancouver College.*

Faculty of Applied Science.

FOURTH YEAR (GRADUATING CLASS).

HONOURS.

(In alphabetical order.)

BORIGHT, SHERMAN HENRY.—Honours in Mining Laboratory Work.

BROWN, FREDERICK BAYLIS.—Honours in Designing, Mechanical Engineering, Thermodynamics and Hydraulics.

COLE, G. PERCY.—Honours in Electrical Designing and Electrical Engineering Laboratory Work.

CONKLIN, ROSCOE YEO, B.A.—Prize for Summer Thesis.

EDWARDS, WILLIAM MUIR, M.Sc.—British Association Medal and Prize; Honours in Designing, Geodesy, Graphical Statics, Hydraulics, Railway Engineering and Theory of Structures.

EGLESON, JAMES ERNEST AIKEN.—British Association Medal and Prize; Honours in Mineralogy, and in Mineral and Physical Chemistry.

FOREMAN, ALVAH ERNEST.—British Association Exhibition; British Association Medal and Prize; Prize for Summer Thesis; Honours in Alternating Currents and Alternating Current Machinery, Electric Power and Distribution, Electric Traction, Electrical Designing, Electrical Laboratory Work and Hydraulics.

HALL, OLIVER.—British Association Prize; Allis-Chalmers Scholarship; Second Carlyle Prize; Prize for Summer Thesis; Honours in Mining Laboratory Work and Mining Designing.

JONES, HAROLD, WILLIAM.—Honours in Railway Engineering.

KEITH, FRASER SANDERSON.—Can. Soc. Civil Eng. Prize; Prize for Summer Thesis; Honours in Electrical Designing and Electrical Engineering Laboratory Work.

MCCASKILL, KENNETH.—Honours in Electric Traction, Electrical Design, Electrical Engineering Laboratory Work.

MCDONALD, JAMES FINLAY.—Honours in Electric Traction.

MCKAY, FREDERICK ALEXANDER.—Can. Soc. Civil Engineers Prize; Prize for Summer Thesis; Honours in Designing.

MCKERGOW, CHARLES MILLER.—Honours in Designing.

MUSGRAVE, ROBERT.—Honours in Mining Laboratory Work.

ROBERTS, ARTHUR REGINALD.—British Association Medal and Prize; Honours in Designing, Hydraulics, Dynamics of Machines, Machine Design, Mechanical Engineering and Thermodynamics.

ROBERTSON, JOHN FERGUSON.—British Association Medal and Prize; Dawson Fellowship in Mining; First Carlyle Prize; Honours in Mining Laboratory Work, Metallurgy, Ore-dressing, Designing and Hydraulics.

ROWLEY, LORNE ELDON, M.A.—Honours in Mining Laboratory Work.

SAVAGE GEORGE MUNRO.—Honours in Organic Chemistry.

PASSED FOR THE DEGREE OF BACHELOR OF SCIENCE.

(In order of merit).

CHEMISTRY.

Egleson, James Ernest Aiken, Ottawa, Ont.
Savage, George Munro, Montreal, Que.
Musgrave, William Newcome, Duncans, Vancouver Island, B.C.
Crawford, Stuart, Montreal, Que.

CIVIL ENGINEERING.

Edwards, William Muir, M. Sc., Montreal, Que.
Jones, Harold William, Ottawa, Ont.
Beck, Alfred Edward, Penetanguishene, Ont.
Cohen, Harris, Montreal, Que.
Landry, Pierre Alfred, Dorchester, N.B.

ELECTRICAL ENGINEERING.

Foreman, Alvah Ernest, Vancouver, B.C.
McCaskill, Kenneth, Vankleek Hill, Ont.
Conklin, Roscoe Yeo, B.A., Winnipeg, Man.
Cole, George Percy, Montreal, Que.
McDonald, James Finlay, Westville, N.S.
Keith, Fraser Sanderson, Smith's Falls, Ont.
Thorpe, William Horseman, Montreal, Que.
Stokes, Charles William, Woodstock, N.B.
James, Bertram, Heart's Content, Newfoundland.
Trimingham, Charles Loch, Barbados, West Indies.

MECHANICAL ENGINEERING.

Roberts, Arthur Reginald, Montreal, Que.
Brown, Frederick Baylis, Montreal, Que.
McKay, Frederick Alexander, Montreal, Que.
McKergow, Charles Millar, Westmount, Que.
Edgar, John Hamilton, Montreal, Que.

MINING ENGINEERING.

Robertson, John Ferguson, Charlottetown, P.E.I.
Hall, Oliver, Washington, Ont.
Tilt, Edwin Bingham, Goderich, Ont.
Boright, Sherman Henry, Sutton, Que.
Lucas, Alan Stanley Bruce, B.A., Hamilton, Ont.
Rowley, Lorne Eldon, M.A., Marysville, N.B.
Pemberton, William Parnell Despard, Gonzales, B.C.
Rowlands, Charles, Albany, N.Y., U.S.A.
Musgrave, Robert, Duncans, Vancouver Island, B.C.
Gale, George Gordon, Quebec, Que.
Stovel, Joseph Hodder, Toronto, Ont.
Langley, Albert Godwin, Victoria, B.C.
Reynolds, Leo Bowlby, Waterford, Ont.
Ross, James Gordon, Embro, Ont.
Maclaren, Francis Harold, Huntingdon, Que.

ADMITTED TO THE DEGREE OF MASTER OF SCIENCE.

(In Course).

Cameron, Kenneth MacKenzie, B.Sc., London, Ont., Can. Soc. C.E. Prize.
Corless, Charles Vandyke, B.Sc., New Durham, Ont.
DePencier, Henry Percy, B.Sc., Vancouver, B.C., Can., Mining Inst. Prize.
Frechette, Howells, B.Sc., Ottawa, Ont.
Newton, Samuel Robert, B.Sc., Drummondville, Que.
Paterson, Charles Stiven, B.Sc., Montreal, Que.
Smith, Gerald Meredith, B.Sc., St. Johns, Que.
Sterns, Frank Ernest, Morrell, P.E.I.

ADMITTED TO THE DEGREE OF DOCTOR OF SCIENCE.

(In Course.)

Owens, Robert Bowie, M.A., E.E. (Columbia, Johns Hopkins), M Sc. (McGill.)

THIRD YEAR.

PRIZES.

(In alphabetical order.)

BLUMENTHAL, SAMUEL.—Prizes for Structural Engineering, Graphical Statics and Geology.
CHAMBERS, ROBERT A.—Prize for Summer Thesis.
CHAPLIN, CHARLES J.—Third Mathematical Prize; Prizes for Theory of Structures, Machine Design and Mechanical Drawing.
COLE, GEORGE H.—Can. Gen. Elect. Scholarship; Second Mathematical Prize; Prizes for Dynamics of Machines, Calculus and Electrical Measurements.
DUTCHER, HOWARD K.—Can. Gen. Elect. Scholarship; Third Mathematical Prize; Prize for Theory of Structures.
GRICE, JAMES H.—Prizes for Mechanics and Graphical Statics.
JOHNSON, FREDERICK M. G.—Prizes for Determinative Mineralogy, and Organic Chemistry.
LAWRENCE, WILLIAM D.—First Mathematical Prize; Second McCarthy Prize for Fieldwork.
LEMAISTRE, FREDERICK J.—Hunt Scholarship.
MCCLOSKEY, FREDERICK W.—Can. Gen. Elect. Scholarship; Prizes for Mechanics and Calculus.
MCDOUGALL, GEORGE K.—Can. Gen. Elect. Scholarship.
MCDOUGALL, CLARENCE H.—Prize for Theory of Structures.
MCPHEE, JAMES McD.—Prizes for Quantitative Analysis, Ore Dressing Machine Design and Metallurgy.
PARLEE, NORMAN W.—Second McCarthy Prize for Fieldwork.

PASSED THE SESSIONAL EXAMINATIONS.

(In order of merit.)

CIVIL ENGINEERING.

Blumenthal, Samuel, Montreal, Que.
Lawrence, William D., Maitland, N.S.
Harvey, John B., Lyndhurst, Ont.

*Lambart, Howard F., New Edinburgh, Ont.
*Healy, Frederick E., Picton, Ont.
*Kent, George M., Truro, N.S.
*Dawe, Robert G., Bay Roberts, Nfld.

ELECTRICAL ENGINEERING.

*McDougall, George K., Montreal, Que.
Cole, George H., Ottawa, Ont.
McCloskey, Frederick W., Boiestown, N.B.
Dutcher, Howard K., Charlottetown, P.E.I.
Cardew, John H., South Beach, Young's Point, Ont.
*Marrotte, Louis H., Westmount, Que.
*Wenger, John A., Avrton, Ont.
Scott, George W., Montreal, Que.
*Wurtele, John S. H., Acton, Que.

MECHANICAL ENGINEERING.

Chaplin, Charles J., Westmount, Que.
Drysdale, William F., Montreal, Que.
Kemp, Robert A. Seaforth, Ont.
Wilkes, Frederick C. D., Brantford, Ont.
*Greey, John W. G., Toronto, Ont.

MINING ENGINEERING.

McPhee, James McD., Lobh Katrine, N.S.
Grice, James H., Bootle, Cumberland, England.
Parlee, Norman W., Rossland, B.C.
*Chambers, Robert A., Truro, N.S.
McDougall, Clarence H., South Maitland, N.S.
*Ells, Sydney, B.A., Ottawa, Ont.
*Carlyle, Ernest J., Woodstock, Ont.
*Gnaedinger, Ernest G., Montreal, Que.
Taylor, Reginald F., Gananoque, Ont.
*Davis, Patrick, Windsor, Ont.
McMurtry, Gordon O., Montreal, Que.
*Atkinson, Marshall B., Montreal, Que.
*Webster, George B., Brockville, Ont.
*Deyell, Harold J., Port Hope, Ont.
*Campbell, Colin St. G., Aldershott, Ont.

PRACTICAL CHEMISTRY.

LeMaistre, Frederick J., Westmount,, Que.
Johnson, Frederick W. G., Montreal.
Spencer, Arthur G., Truro, N.S.

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*McNaughton, William G., Huntingdon, Que.

SECOND YEAR.

PRIZES.

(In alphabetical order.)

Blanchet, Guy H.—Second Scott Prize; Can. Soc. Civil Eng. Prize.
Boyle, Robert W.—First Scott Prize; Prizes for Calculus, Chemistry, Experimental Physics, Kinematics of Machines, and Descriptive Geometry.

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*To pass Supplemental Examination.

Churchill, Cecil A.—Prize for Mapping.
Cropper, William C.—Prize for Analytic Geometry.
Fyshe, Thomas M.—Scott Exhibition.
Jewett, F. Coburn.—Prize for Surveying.
MacDermot, Sidney G. F.—Prize for Physical Laboratory Work.
MacMillen, Henry H.—Prize for Mechanics.
Pattison, Albert M.—Prize for Freehand Drawing.
Sutherland, Charles H.—Prize for Mechanical Drawing.

PASSED THE SESSIONAL EXAMINATION.

(In order of merit.)

ARCHITECTURE.

Pattison, Albert M., Clarenceville, Que.

CIVIL ENGINEERING.

Jewett, F. Coburn, Sheffield, N.B.
Fyshe, Thomas M., Montreal, Que.
Kydd, George, Montreal, Que.
*Jost, Edward B., Guysboro, N.S.
Macnab, John J., Elsinore, Bruce Co., Ont.
*Idsardi, Harold, St. Thomas, Ont.
*†Hamilton, Wilfrid, Montreal, Que.
*McIntosh, Robert, Newcastle, Ont.

ELECTRICAL ENGINEERING.

Boyle, Robert W., Carbonear, Nfld.
Cropper, William C. McD., Kingston, St. Vincent, W.I.
McDermot, Sidney G. F., Gordon Town, Jamaica, W.I.
Willard, Charlie, Morrisburg, Ont.
Scouler, Gavin T., New Westminster, B.C.
Redpath, William, Montreal, Que.
McLeish, Ian, Montreal, Que.
Bowness, E. W., Kensington, P.E.I.
Cunha, Staton H. S., Kingston, Jamaica, W.I.
Wheaton, Hazen A., Elgin, Albert Co., N.B.
Findlay, Delmer C., Danville, Que.
Archibald, Hiram H., Harbour Grace, Nfld.
Glassco, Gordon B., Hamilton, Ont.
Campbell, John A., Cheltenham, Ont.
Johnstone, George A., Rednersville, Ont.
Drinkwater, Kenneth E., Montreal, Que.
Weagant, Roy A., Derby Line, Vt., U.S.A.
Mundy, Oswald A., Hamilton, Ont.
*Burpee, Lockwood, Gibson, N.B.
Piché, Ernest A., Montreal, Que.
*McLean, Donald, B.A., Campbellton, N.B.
Wright, Clifton H., Barbados, W.I.
Harris, Alan Dale, Ottawa, Ont.
*Joseph, A. Pinto, Quebec, Que.
*Eaton, E. Courtlandt, Montreal, Que.
Price, Herbert L., Montmorency, Que.
*Ross, Walter G., Port Perry, Ont.
*Dickson, George L., Truro, N.S.

**To pass Supplemental Examination.*
†Conditioned in First Year Subject.

MECHANICAL ENGINEERING.

MacMillan, Henry H., Alberry Plains, P.E.I.
Cockshutt, Harvey W., Brantford, Ont.
Sutherland, Charles H., New Glasgow, N.S.
*Mooney, Chester A., Ausable Chasm, N.Y.
*Fraser, Donald M., Montreal, Que.
Turnbull, Harvard, Montreal, Que.

MINING ENGINEERING.

Blanchet, Guy H., Ottawa, Ont.
Churchill, Cecil A., Hantsport, N.S.
Livingston, Douglas C., Corfield, B.C.
Sharpe, George P., Agassiz, B.C.
Martin, Edward N., York, Ont.

PRACTICAL CHEMISTRY.

Robertson,, Arthur F., Montreal, Que.
*Baker, Charles C. Stanley, Hampstead, London, England.

FIRST YEAR.

PRIZES.

(In alphabetical order.)

Bell, George E.—Prizes for Mathematics, English and Lettering.
Brennan, George E.—Prize for Freehand Drawing.
Cattanach, F. W. C.—Prize for Physics.
Durland, Royden K.—First Fleet Workshop Prize.
Forbes, John McN.—Prize for Mathematics.
Harvie, Robert.—Second Fleet Workshop Prize.
Lea, William S.—Prize for Descriptive Geometry.
McLachlan, D. William.—Prize for Mathematics .
Presner, Joseph.—Prize for Lettering.

PASSED THE SESSIONAL EXAMINATIONS.

(In order of merit. Students of equal standing are bracketed together.)

Bell, George E., St. Thomas, Ont.
Durland, Royden K., Yarmouth, N.S.
McLachlan, D. William, Lochaber Bay, Que.
Lea, William S., Victoria, P.E.I.
Brennan, George E., Ottawa, Ont.
Forbes, John McN.—Bonavista, Nfld.
Jones, Andrew U., St. John, N.B.
Sharp, Lester A., Summerside, P.E.I.
Jackson, Maunsell B., Toronto, Ont.
Walker, Cecil W., Kensington, P.E.I.
Pedley, Norman F., Montreal, Que.
Anderson, Frederic W., Ottawa, Ont.
Cattanach, Frederick W. C., Newport, Vt.
Blackader, Gordon H., Montreal, Que.
Macdonald, Peter J.—Winnipeg, Man.
Kirkpatrick, Everett C., Montreal West, Que.
Winter, Elliott E., Georgetown, Brit. Guiana.

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*To pass *Supplemental Examination.*

Ewens, W. Sydney, Owen Sound, Ont.
†Wilson, Starr R. L., Lunenburg, N.S.
Roger, Alec, Billing's Bridge, Ont.
McMeekin, Albert, Bright, Ont.
†Loudon, Andrew C., Ottawa, Ont.
Hadley, Harry, Montreal, Que.
*Turley, Edward J., Frankford, Ont.
*Benedict, Elmore M., Brantford, Ont.
Harding, Winthrop K., Derby Line, Vt.
McCuaig, G. Eric, Montreal, Que.
Presner, Joseph, Montreal, Que.
*†Burnett, Archibald, Montreal, Que.
*†Cole, L. Heber, Montreal, Que.
Boyd, Alfred M. S., Westmount, Que.
Howell, Edgar N., Westmount, Que.
*Davidson, Thomas R., Montreal, Que.
Steedman, William F., Montreal, Que.
*Tupper, Frederick McD., Truro, N.S.
*Gurd, A. Douglas, Montreal, Que.
*Brady, James C., Victoria, B.C.
*Leonard, Albert P., Westmount, Que.
Pickard, Herbert G., Exeter, Ont.
*Conway, Edmund J., Chemainus, B.C.
Hibbard, Melville L., Farnham, Que.
Scott, W. Gordon, Valleyfield, Que.
*†Macdonald, R. Ross, Hamilton, Ont.
Landry, A. Raymond, Dorchester, N.B.
*Black, Douglas E., Montreal, Que.
*McDonald, Harold F., Fort Qu'Appelle, Assa.
*Taylor, Allan H., Ottawa, Ont.
*Corrigan, Thomas L., Brockville, Ont.
*Harvie, James, Westmount, Que.
*†Slater, Nicholas J., Ottawa, Ont.
*Mudge, Reginald, Montreal, Que.
*Norton, Thomas J., Montreal, Que.
*Newton, Stephen G., Drummondville, Que.
*Greenshields, John G., Montreal, Que.
*Grier, Arthur H., Montreal, Que.
*†McKinnon, Hugh D., Finch, Ont.
*†Smith, Kenneth H., London, Ont.
*Baylis, Harold A., Montreal, Que.
*Frith, George H., Cummings' Bridge, Ont.

STANDING IN THE SEVERAL SUBJECTS.

(Subjects alphabetically arranged.)

ALTERNATING CURRENT AND ALTERNATING CURRENT MACHINERY.

FOURTH YEAR.—*Class I.*—Foreman. *Class II.*—McCaskill, McDonald, Stokes, Conklin, Thorpe. *Class III.*—Trimingham, Cole, Keith; Baker and James, equal.

ARCHITECTURAL DRAWING AND DESIGN.

SECOND YEAR.—*Class III.*—Pattison.

**To pass Supplemental Examination.*
†Matriculation conditioned.

ARCHITECTURE (ELEMENTS OF).

SECOND YEAR.—*Class III.*—Pattison.

ARCHITECTURE (HISTORY OF).

SECOND YEAR.—*Class II.*—Pattison.

ASTRONOMY.

THIRD YEAR.—*Class I.*—Grice, Harvey; Lawrence and McPhee, equal. *Class II.*—Parlee, Blumenthal; Dawe and Taylor, equal. *Class III.*—Carlyle, Healy, McMurtry, Sullivan, McDougall (C. H.), Lambart, Wilson; Ells and Hogan and Reynolds, equal; Chambers and Davis, equal; Deyell, Webster; Campbell and Cameron and Gnaedinger, equal.

CHEMISTRY (THEORETICAL).

SECOND YEAR—*Class I.*—Boyle, Fyshe. *Class II.*— Willard, MacDermot, Wheaton, Jewett; Campbell and Cunha and Kydd and McLean, equal; Blanchet, Robertson; Cropper and Macnab, equal. *Class III.*—Bowness, Johnstone, Findlay, Livingston, Archibald, Redpath; Bray and Churchill, equal; Sutherland (C. H.), Scouler; Ritchie and Ryan, equal; Baker and Dickson (G. L.), equal; Cockshutt and Wright, equal; Piche, Ross; Fraser (D. M.) and Glassco and Mooney and Sharpe, equal; Drinkwater and Idsardi and Martin, equal; Burpee and Mundy, equal; Small, Pinch; Jost and Turnbull, equal; McIntosh and Young, equal.

CHEMISTRY (PRACTICAL).

SECOND YEAR.—(*Civil, Electrical and Mechanical Engineering Courses.*)—*Class I.*—Boyle and Willard, equal; Campbell and Jost and MacDermot and Wheaton, equal; Fyshe and Jewett and Kidd, equal; Cropper and Idsardi, equal; Glassco, Gillespie. *Class II.*—Barclay and Macnab and Scouler, equal; Bowness and Dickson (G. L.) and Findlay and Ross, equal; Bray and Burpee and Fraser (D. M.) and McIntosh, equal; Cockshutt, Cunha; Eaton and Higgins and Smith, equal; Johnstone and Sutherland (C.), equal; Archibald and Gibbs and Redpath and Wright, equal. *Class III.*—McLean, Pinch, Drinkwater, Weagant; Batchelder and Ryan, equal; Miner and Mooney, equal; Eadie; Anderson and Bain and Blackadar and Rheaume and Shaughnessy and Small and Turnbull, equal. (*Mining Engineering Course.*)—*Class I.*—Hodgson, Churchill, Livingston, Blanchet, Ritchie. *Class II.*—Young, Sharpe. *Class III.*—Belanger; Hamilton (A. M.) and Martin, equal. (*Practical Chemistry Course.*)—*Class I.*—Robertson.

CHEMISTRY—ORGANIC (PRACTICAL).

THIRD YEAR.—*Class I.*—LeMaistre and Robinson (K. S.,) equal; Johnson and Spencer, equal.

CHEMISTRY—ORGANIC (THEORETICAL).

THIRD YEAR.—*Class I.*—Johnson. *Class II.*—Robinson (K. S.), Spencer. *Class III.*—LeMaistre.

CHEMISTRY—PHYSICAL (PRACTICAL).

FOURTH YEAR.—*Class I.*—Egleson. *Class II.*—Crawford. *Class III.*—Musgrave (W. N.) and Savage, equal; McNaughton.

CHEMISTRY—PHYSICAL (THEORETICAL).

FOURTH YEAR.—*Class I.*—Egleson. *Class II.*—Musgrave (W. N.), Crawford. *Class III.*—Savage, MacNaughton.

CHEMISTRY (INDUSTRIAL).

THIRD YEAR.—*Class I.*—Spencer, Johnson, LeMaistre. *Class II.*—Robinson (K. S.).

CONTINUOUS CURRENT AND COMMUTATING MACHINERY.

THIRD YEAR.—*Class I.*—McDougall (G. K.). *Class II.*—Wenger, McCloskey. *Class III.*—Drysdale, Cole, Chaplin, Dutcher, Scott, Marrotte, Cardew, Kemp, Wurtele, Wilkes.

DESCRIPTIVE GEOMETRY.

THIRD YEAR.—*Class I.*—Blumenthal. *Class II.*—Lawrence, Healy, Harvey. *Class III.*—Kent, Dawe.

SECOND YEAR.—*Class I.*—Jost, Boyle; Cropper and McLeish and Piché, equal; Fyshe, Redpath, Johnstone; Archibald and Willard, equal. *Class II.*—Findlay, Churchill, Burpee, Blanchet, Kydd; Drinkwater and Sharpe, equal; Macnab; Harris and Jewett and Scouler, equal; Bowness and Idsardi and MacMillen, equal; Livingston and Wheaton, equal. *Class III.*—Sutherland (C. H.), Pattison, McLean, Moody, MacDermot, Eadie; Cockshutt and Hamilton (A. M.), equal; Glassco and Hamilton (W.) and Weagant, equal; McIntosh; Miner; Campbell and Cunha and Eaton and Fraser (D. M.) and Martin and Turnbull and Wright, equal.

FIRST YEAR.—*Class I.*—Lea, Durland, McLachlan (D. W.), Bell, Walker; Brennan and Wilson, equal; Sharp, Blackader, Forbes, Cattenach, Jackson; Black and Kirkpatrick and Roger, equal; Ewens and Jones, equal; Gurd. *Class II.*—Burnett and Wickware, equal; Cole, Turley, Anderson; Conway and Loudon, equal; Davidson; Boyd and Tupper, equal; Newton, Benedict; Macdonald (R. R.) and Pedley, equal; Hadley; Macdonald (P. J.) and Skelton, equal; Harding, Leonard, Presner, Winter, Wheaton, Harvie (J.). *Class III.*—McCuaig; Hibbard and McDonald (H. F.), equal; Baylis, Small, Corrigan; Howell and McMeekin and MacKay (G. W.), equal; Grier and Slater, equal; McKinnon, Howe and Scott (W. G.) and Steedman equal; Brady, Norton; Daly and Shorey, equal; Carlyle and Mudge, equal; Frith, Landry; Greenshields and MacKay (R. M.) and Pickard and Slavin and Smith and Taylor, equal.

DESIGNING.

FOURTH YEAR—(*Civil Engineering Course.*)—*Class I.*—Edwards, Beck, Jones. *Class II.*—Cohen, Landry. (*Electrical Engineering Course.*)—*Class I.*—Cole and Foreman, equal; Keith, McCaskill. *Class II.*—Conklin, McDonald, Thorpe; Baker and Stokes, equal. *Class III.*—James, Blatch, Rodger. (*Mechanical Engineering Course.*)—*Class I.*—Roberts; Brown and McKay and McKergow, equal. *Class II.*—None. *Class III.*—Millar, Edgar. (*Mining Engineering Course.*)—*Class I.*—Hall, Robertson, Boright. *Class II.*—Kendall and Rowlands and Tilt, equal; Reynolds; Porcheron and Ross and Rowley, equal; Langley and Lucas and Musgrave (R), equal. *Class III.*—Pemberton, Gale; Maclaren and Stovel, equal.

DYNAMICS OF MACHINES.

FOURTH YEAR.—*Class I.*—Roberts, Brown, McKay. *Class II.*—McKergow, Edgar.

THIRD YEAR.—*Class I.*—Cole. *Class II.*—Chaplin, Scott, Fraser (D. M.); Drysdale and McDougall (G. K.), equal; McCloskey, Wenger. *Class III.*—Cardew and Dutcher, equal; Wurtele, Wilkes, Greey; Kemp and Marrotte ,equal; Devlin, Roffey.

ELECTRIC LIGHTING AND POWER DISTRIBUTION.

FOURTH YEAR.—*Class I.*—Foreman. *Class II.*—McCaskill, Cole, McDonald, James. *Class III.*—Keith; Baker and Conklin, equal; Stokes, Rodger; Thorpe and Trimingham, equal.

ELECTRICAL MEASUREMENTS.

THIRD YEAR.—*Class I.*—Cole and McDougall (G. K.), equal. *Class II.*—Cardew and McCloskey and Marrotte, equal; Dutcher and Scott and Wenger and Wurtele, equal; Devlin and Price, equal. *Class III.*—Roffey.

ELECTRO-METALLURGY.

FOURTH YEAR.—*Class I.*—Robertson, Rowlands; Rowley and Stovel, equal. *Class II.*—Hall and Lucas, equal; Boright and Gale, equal; Langley and Pemberton, equal; Musgrave (R.).

ELECTRIC TRACTION.

FOURTH YEAR.—*Class I.*—Foreman, McCaskill, McDonald. *Class II.*—Baker, Conklin, Cole. *Class III.*—Keith, Thorpe, James, Stokes, Blatch; Rodger and Trimingham, equal.

ELECTRO-CHEMISTRY.

FOURTH YEAR.—*Class I.*—Conklin; Keith and McDonald, equal. *Class II.*—Cole; Baker and McCaskill, equal; Blatch. *Class III.*—Thorpe.

ENGLISH.

FIRST YEAR.—*Class I.*—Bell, Steedman, Durland; Brady and Jackson, equal; Tupper. *Class II.*—Cole and Conway and Forbes, equal; Loudon and McDonald (H. F.), equal; Hadley, McMeekin, Winter, McLachlan; McCuaig and Mudge and Scott, equal; Pedley, Ewens, Brennan, Black, Taylor; Hodge and MacKinnon, equal; Anderson and Corrigan, equal; Blackader and Jardine and Macdonald (P. J.) and Pickard, equal. *Class III.*—Boyd and Kirkpatrick and Presner and Shorey, equal; Howell and Mackay (G. W.), equal; Jones; Cattanach and Leonard and Sharp, equal; Baylis and Greenshields, equal; Daly and Harmer, equal; Davidson and Dickson and Harding and Lea and Turley, equal; Gurd and Harvie (J.) and Slavin, equal; Brown and Frith, equal; Mackay (R. M.) and Wilson, equal; Burnett and Newton and Smith, equal; Macdonald (R. R.); Howe and Prevost, equal; Grier, Wheaton; Benedict and Small, equal; Carlyle; Bellasis and Lemoine and Pillow, equal; Cowen and Slater, equal.

ENGLISH SUMMER READING.

SECOND YEAR.—*Class I.*—Jewett; Boyle and Cropper, equal; Campbell and Fyshe and Wheaton, equal. *Class II.*—Bowness, McLeish; Blanchet and Kydd, equal; Small, MacDermot, Redpath, Livingston, Ross. *Class III.*—Wright; Greenshields and Scouler, equal; McIntosh; Glassco and Ritchie, equal; Roger; Burpee and Findlay and MacMillen, equal; Cockshutt and Willard, equal; Eaton, Robertson, Sutherland (D. H.), Churchill, Jost; Idsardi and Pinch, equal; Belanger and Blackader and Cunha and Drinkwater and Mooney and Ryan and Young, equal.

FIRE ASSAYING.

THIRD YEAR.—*Class I.*—None. *Class II.*—Parlee, McPhee; Carlyle and Chambers, equal; Campbell and McDougall (C. H.) and McMurtry, equal; Atkinson and Baker, equal. *Class III.*—Cameron and Grice, equal; Davis and Deyell and Spencer and Taylor and Wilson, equal; Ells, Webster; Gnaedinger and Sullivan, equal; LeMaistre.

FREEHAND DRAWING.

FIRST YEAR.—*Class I.*—Brennan; Durland and Harding and Loudon, equal; Bell and Cattanach and Leonard, equal; Shorey; Macdonald (R. R.) and Presner, equal; Anderson and Blackader and Cole and Ewens and Mudge and Tupper, equal; Dickson and Forbes and McCuaig and McLachlan (D. W.) and Smith and Wright, equal. *Class II.*—Baylis and Hadley and Harvie (J.) and Hassberger and Hodge and Jardine and Prevost, equal; Grier and Howe and Jones and Roger, equal; Boyd and Burnett and Gurd and Howell and Kirkpatrick and Newton and Sharp, equal; Black and Cowen and Davidson and Landry and Norton and Ryan and Walker and Wickware, equal; Hibbard and Jackson, equal; Daly and Haskell and Pickard and Skelton and Steedman, equal; Benedict and Carlyle and McDonald (H. F.) and McMeekin and Wheaton, equal; Dickenson and Johnson and Lea and Small and Wilson and Winter, equal. *Class III.*—MacKay (R. M.) and Slater and Slavin and Turley, equal; Brady and Conway and Macdonald (P. J.) and Scott, equal; Corrigan; Brown and Lynch and Poupore, equal; Pedley; Frith and Gaunt, equal; Bellasis and Pillow and Taylor, equal.

SECOND YEAR.—*Class I.*—Pattison.

GAS ANALYSIS.

FOURTH YEAR.—*Class I.*—Egleson. *Class II.*—Savage, Crawford, Musgrave (W. N.).

GEODESY.

FOURTH YEAR.—*Class I.*—Edwards. *Class II.*—Jones and Landry, equal. *Class III.*—Cohen, Beck.

GEOLOGY AND ORE DEPOSITS.

FOURTH YEAR.—*Class I.*—Robertson. *Class II.*—Hall, Rowlands, Tilt; Gale and Lucas equal; Rowley; Boright and Musgrave (R.), equal; Stovel. *Class III.*—Reynolds, Langley; Maclaren and Pemberton, equal; Ross, Kendall.

GEOLOGY AND MUSEUM WORK.

THIRD YEAR.—*Class I.*—Blumenthal. *Class II.*—Spencer, McPhee; Grice and Parlee, equal; Johnson; Gnaedinger and Harvey, equal; Campbell and Carlyle, equal. *Class III.*—LeMaistre, Lawrence, Chambers, McDougall (C. H.), Cameron, Taylor; Kent and McMurtry, equal; Webster, Deyell, Healy; Atkinson, and Lambart and Sullivan, equal.

GRAPHICAL STATICS.

FOURTH YEAR.—*Class I.*—Edwards, Jones. *Class II.*—Beck and Cohen, equa;. *Class III.*—Landry.

THIRD YEAR.—*Class I.*—Blumenthal and Grice, equal; Chaplin; Greey and Lawrence and Scott, equal; Dutcher, Chambers; Carlyle and Drysdale and McDougall (G. K.), equal; Wilkes; Cardew and Cole and Gnaedinger and Kemp and Marrotte, equal. Wenger, equal; Dawe and Lambart and Parlee, equal; Ells; *Class II.*—Healy and Harvey, equal; Davis and Deyell and McDougall (C. H.) and Wurtele, equal; McMurtry; Hogan and Webster, equal; McPhee and Wilson, equal; McCloskey. *Class III.*—Atkinson; Cameron and Taylor, equal; Campbell and Kent, equal; Roffey.

HYDRAULICS.

FOURTH YEAR.—(*Full Course.*)—*Class I.*—Brown, Foreman, Edwards, Roberts. *Class II.*—Tilt, McKergow. *Class III.*—Edgar, Stokes; Cohen and McKay, equal; Landry and Reynolds, equal; Beck and Maclaren and Ross, equal; Jones, James; Kendall and Millar and Porcheron and Rodger, equal; Trimingham. (*Partial Course.*)—*Class I.*—Robertson, Rowley, Hall. *Class II.*—Conklin and Lucas, equal; Boright and Cummings and McDonald, equal; Gale and Pemberton, equal; Stovel, Musgrave (R.); Keith and Rowlands, equal; McCaskill, Baker, Thorpe, Cole; Blatch and Langley, equal.

HYDRAULIC MACHINERY.

FOURTH YEAR.—*Class I.*—Roberts; Conklin and Foreman and Robertson, equal; Brown and Edwards, equal; McCaskill, Cole. *Class II.*—Hall; Baker and Edgar and Langley and McKay, equal; McKergow and Pemberton and Rowley, equal; McDonald, Tilt; Boright and Rowlands, equal; Thorpe; Beck and Kendall and Lucas, equal. *Class III.*—Jones and Keith and Musgrave (R.) and Stokes, equal; Blatch and Gale, equal; Maclaren, Millar; Cohen and Reynolds and Stovel, equal; Landry; James and Ross, equal; Porcheron. Aegrotat:—Trimingham.

KINEMATICS OF MACHINES.

SECOND YEAR.—*Class I.*—Boyle, Glassco. *Class II.*—McLeish; Cropper and Cunha, equal; Burpee and Harris and Price, equal; Archibald and Mundy, equal; Scouler; Campbell and Drinkwater, equal; McDermot and Willard, equal; Piché, McMillen; Mooney and Wright, equal; Wheaton; Bowness and Cockshutt and Findlay, equal; Sutherland and Turnbull and Weagant, equal. *Class III.*—Redpath, Johnstone, Eaton; Gillespie and Joseph, equal; Dickson (G. L.), Ross; Gibbs and Higgins, equal; Barclay; Batchelder and Pinch, equal; Bain.

LABORATORIES.

FOURTH YEAR.—(Chemical Laboratory.)—(*Mining Engineering Course.*) —*Class I.*—Robertson. *Class II.*—Lucas, Pemberton, Tilt; Rowley and Langley, equal; Rowlands, Gale, Musgrave (R.). *Class III.*—Stovel; Porcheron and Reynolds, equal; Boright, Hall, Ross, Maclaren. (*Chemistry Course.*)—*Class I.*—Egleson. Savage. *Class II.*—Musgrave (W. N.), Crawford.

THIRD YEAR.—(Chemical Laboratory.)—(*Mining Engineering Course.*)—*Class I.*—McPhee; Atkinson and Chambers and Parlee, equal; Campbell and Carlyle, equal. *Class II.*—Deyell, Grice, McDougall (C. H.); McMurtry and Taylor, equal; Ells; Cameron and Gnaedinger and Wilson, equal; Davis. *Class III.*—Irving, Webster. (*Chemistry Course.*)—*Class I.*—LeMaistre, Spencer, Johnson. *Class III.*—*McNaughton.

FOURTH YEAR.—(*Electrical Engineering Laboratories.*)—*Class I.*—Cole Foreman and Keith and McCaskill, equal. *Class II.*—Conklin and McDonald, equal; Baker and James, equal; Thorpe. *Class III.*—Blatch and Stokes and Trimmingham, equal; Rodger.

THIRD Year.—(*Electrical Engineering Laboratories.*)—(*Electrical Engineering Course.*)—*Class I.*—McDougall (G.H.) McCloskey Robinson (H G.), Robinson (K. S.). *Class II.*—Cardew, Marrotte, Dutcher, Wenger, Scott. *Class III.*—Cole, Devlin, Wurtele, Roffev. (*Mechanical Engineering Course*).—*Class I.* Chaplin, Kemp. *Class II.*—Drysdale. *Class III.*—Wilkes, Greey.

FOURTH YEAR.—(*Geodetic Laboratory.*) — *Class I.*—Beck and Jones, equal. *Class II.*—Edwards, Landry, Cohen.

FOURTH YEAR.—(*Hydraulic Laboratory.*)—*Class I.*—Brown and Roberts, equal; Conklin and Foreman and McKay and McKergow, equal; McCaskill and Rowlands, equal; Hall and McDonald and Rowley and Tilt and Thorpe, equal; Gale and Musgrave (R.), equal. *Class II.*—Cole and Keith and Robertson and Stokes, equal; Baker and Boright and Jones and Stovel, equal; Cumming and James and Kendall and Landry and Lucas and Maclaren and Rodger and Millar, equal; Blatch and Cohen and Langley and Pemberton and Ross and Trimingham, equal; Beck. *Class III.*—Jennings and Reynolds, equal; Porcheron.

FOURTH YEAR.—(*Mechanical Engineering Laboratory.*)—(*Electrical Engineering Course*)—*Class I.*—Baker and Conklin, equal; Foreman and Keith, equal. *Class II.*—McCaskill and McDonald, equal; Cole and Trimingham, equal; Thorpe, Stokes. *Class III.*—Blatch and James, equal; Rodger.

FOURTH YEAR.—(*Mining and Metallurgical Laboratory.*)—*Class I.*—Hall, Robertson, Rowley, Musgrave, (R); Boright, and Stovel, equal, Kendall; Lucas and Tilt, equal. *Class II.*—Porcheron, Rowlands; Langley and Ross, equal; Pemberton; Gale and Maclaren, equal; Reynolds.

SECOND YEAR.—(*Physical Laboratory.*)—(*Civil, Mechanical, Mining and Chemistry Courses.*) *Class I.*—Belanger and Blanchet and Fyshe and Gillepsie and Idsardi and Jewett and Jost and Kidd and Livingston and MacMillen and Macnab and Pattison and Spencer, equal; McIntosh, Young; Churchill and Pinch and Ryan and Turnbull, equal; Cockshutt; Gibbs and Ritchie, equal. *Class II.*—Miner, Sutherland (C. H.); Eadie and Mooney, equal; Sharpe, Gillies, Shaughnessy. *Class III.* Robertson. (*Electrical Engineering Course.*) *Class I.*—MacDermot; Boyle and Scouler, equal; Burpee; McLean and Redpath and Willard, equal; Cunha, Glassco; Drinkwater and McLeish, equal; Cropper, Harris, Findlay, Bowness; Archibald and Small and Weagant, equal; Wheaton, Johnstone; Campbell and Piché, equal. *Class II.*—Bain and Eaton and Joseph, equal; Wright, Ross, Dickson (C.L.), †Bray, Higgins, †Batchelder. *Class III.*—Anderson.

**Supplemental in Iron and Steel Analysis.*

† *Supplemental in Paper.*

FIRST YEAR.—*(Physical Laboratory.)*—(Alphabetical Order) Anderson, Baylis, Beaudry, Bell, Bellasis, Benedict, Black, Blackader, Brady, Brennan, Brown, Burnett, Carlyle, Cattanach, Cole, Conway, Corrigan, Cowen, Daly, Davidson, Dickenson, Dickson, Durland, Ewens, Forbes, Frith, Gaunt, Graham (W.S), Grier, Gurd, Hadley, Harding, Harmer, Harvie (J.), Harvie (R.), Hibbard, Hodge, Howe, Howell, Jackson, Jardine, Jones, Kirkpatrick, Landry, Lemoine, Lea, Leonard, Loudon, Lynch, Mather, Macdonald (P.J.), Macdonald (R.R.), Mackay (C.W.), Mackay (R.M.), McCuaig, McDonald (H.F.), McKinnon, McLachlan (D.W.) McMeekin, Mudge, Newton, Norton, Pedley, Pickard, Pillow, Poupore, Presner, Prevost, Ryan (F.G.), Scott (W.G.), Sharp, Shorey, Simard, Skelton, Slater, Slavin, Small, Smith, Steedman, Taylor, Tupper, Turley, Walker, Wilson, Wickware, Winter, Wheaton.

FOURTH YEAR.—*(Testing Laboratory.)* *Class I.*—Edwards. *Class II.*—Beck and Cohen and Jones, equal. *Class III.*—Landry.

THIRD YEAR.—*(Testing Laboratory.)* *(Full Course.)* *Class I.*—McDougall, (G. K.), Drysdale, Wilkes; Chaplin and Greey, equal; Marrotte; Cole and McCloskey, equal; Dutcher and Cardew, equal. *Class II.*—Kemp, Irving, Wenger, Wurtele; Devlin and Scott, equal. *(Partial Course.)* *Class I.*—Harvey, McPhee, Blumenthal. *Class II.*—McDougall (C. H.), Parlee, Lawrence; Deyell and Taylor, equal; Dawe and Chambers and Lambart, equal; Campbell, Kent; Atkinson and Webster, equal; Carlyle. *Class III.*—Ells, Wilson; Healy and McMurtry, equal; Davis; Grice and Sullivan, equal; Cameron and Hogan, equal; Gnaedinger, Roffey, Martin.

FOURTH YEAR.—*(Thermodynamic Laboratory.)* *Class II.*—Roberts, McKay; Brown and McKergow, equal. *Class III.*—Edgar, Millar.

LETTERING.

FIRST YEAR.—*Class I.*—Bell and Presner, equal; Cole and Lea and McKinnon, equal; Durland and Kirkpatrick and Mudge and Prevost and Tupper, equal; Harding, Brady and Brennan and Conway and Loudon, equal; Black and Blackader and Dickenson and Leonard, equal; Beaudry and Hadley and McCuaig and Norton, equal; Hibbard and Hodge and Howell, equal; Harvie (J.) and McLachlin (D.), equal; Forbes and Gurd and Shorey, equal. *Class II.*—Cattanach and Macdonald (R. R.) and Roger, equal; Daly and Grier and Hassberger and Sharp and Walker, equal; Baylis and Burnett and Pickard and Winter, equal; Anderson and Davidson and Jardine and Landry and Skelton, equal; Haskell and Macdonald (P. J.) and McMeekin and Newton and Pedley and Wilson, equal; Ewens and Robb and Smith, equal; Benedict and Jackson, equal; Boyd and Jones and Small, equal; Carlyle and Howe and Pillow and Taylor and Wheaton, equal; Bellasis and Brown and Cowen and Rolland, equal. *Class III.*—Frith and MacKay (R. M.) and Richards and Scott and Steedman, equal; Corrigan and McDonald (H. F.), equal; Harmer and Slavin, equal; Simard, Turley, Slater, Ryan, Wickware.

MACHINE DESIGN.

FOURTH YEAR.—[*Electrical Engineering Course.*]—*Class I.*—Foreman. *Class II.*—Conklin, McCaskill. *Class III.*—Baker, Thorpe, Cole; McDonald and Stokes, equal; Blatch and James and Keith, equal; Trimingham. *Mechanical Engineering Course.*—*Class I.*—Roberts. *Class II.*—Brown. *Class III.*—McKay, McKergow, Millar, Edgar.

THIRD YEAR.—*Class I.*—Chaplin, McPhee, Cole; Grice and McCloskey, equal; McDougall [G. K.] and Wenger, equal. *Class II.*—Chambers and Fraser [D. M.] and Webster, equal; Kemp, Cardew and Greey and Parlee, equal; Dutcher. *Class III.*—Drysdale and Marrotte and McDougall [C. H.] and Scott, equal; Davis and Ells, equal; Atkinson and Wurtele, equal; Campbell and Price and Wilkes, equal; Deyell; Gnaedinger and McMurtry, equal; Taylor.

MAPPING.

THIRD YEAR—*Class I.*—Harvey, Blumenthal. *Class II.* — Lambart, Dawe, Hogan, Lawrence, Healy, Kent.

SECOND YEAR—[*Civil Engineering Course*]—*Class I.*—Jost. *Class II.*—Jewett, Fyshe, McIntosh, Lockerby, Idsardi. *Class III.*—Kydd, Macnab. [*Mining EngineeringCourse.*]—*Class I.*—Churchill. *Class II.*—Livingston, Blanchet. *Class III.*—Young, Sharpe, Belanger, Ritchie.

MATHEMATICS.

THIRD YEAR.—(*Calculus, etc.*) *Class I.*—Cole, McCloskey, Dutcher, Lawrence, McPhee, Drysdale. *Class II.*—McMurtry; Cardew and Wenger, equal; Blumenthal and Davis, equal; McDougall (C. H.), Carlyle, Grice, Harvey, Chaplin. *Class III.*—Chambers, Taylor, Parlee; Kemp and Wilkes, equal; Würtele; Devlin and *Roffey and Sullivan, equal; Gnaedinger and Lambart, equal; Greey, Campbell; *Ells and *Kent, equal; Atkinson.

(*Mechanics.*)—*Class I.*—Grice and McCloskey, equal; Blumenthal; Drysdale and Lawrence, equal; Cole (G. H.) and Davis, equal. *Class II.*—Marrotte and McDougall (G. K.) and McPhee, equal; Dutcher; Chaplin and Parlee, equal. *Class III.*—Chambers; Carlyle and Scott, equal; Lambart and Roffey, equal; Cardew and Harvey and Kent and McDougall (C. H.), equal; Dawe and McMurtry, equal; Taylor; Atkinson and Ells and Kemp and Wilkes, equal. (*Special Examination in Calculus, etc.*) *Class III.*—Deyell.

SECOND YEAR.—(*Analytic Geometry.*)—*Class I.*—Cropper, Boyle, McMillen; Jost and McLeish, equal; Cunha and Jewett, equal; Fyshe; Blanchet and Scouler, equal; MacDermot. *Class II.*—Archibald, Drinkwater; Miner and Willard, equal; McLean; Bowness and Mundy, equal; Churchill, Baker, Wheaton, Harris; Johnstone and Kydd and Livingston and Sutherland (C.) and Weagant, equal; Glassco. *Class III.*—Cockshutt and Findlay and Pattison and Ryan, equal; Rray; Macnab and Price and Ross, equal; Campbell (J. A.) and Robertson, equal; Redpath; Eadie and Higgins and Martin and Wright, equal; Piché, Mooney; Batchelder and Burpee and Fraser (D. M.) and Mackintosh, equal; Turnbull, Hamilton (W.), Eaton; Barclay and Sharpe, equal; Dickson (G. L.) and Gibbs, equal.

Calculus.—Class I.—Boyle, MacDermot, Fyshe, McLeish, Blanchet. *Class II.*—MacMillen, McLean, Willard, Cropper, Livingston; Glassco and Sharp, equal; Drinkwater, Findlay. *Class III.*—Redpath; Archibald and Cockshutt and Jewett, equal; Cunha and Harris and Sutherland (C.) and Weagant, equal; Pattison, Miner; Johnstone and Mundy and Scouler, equal; Campbell and Churchill and Joseph and Wright, equal; Hamilton (W.) and Turnbull, equal; Price; Baker and Martin, equal; Kydd, Robertson; Eaton and Piché, equal; Fraser (D. M.) and Macnab, equal; Mooney, Bowness; Bray and Eaton and Wheaton, equal.

Mechanics.—Class I.—MacMillen, Kydd, Jost, Willard, Boyle, McLeish; Blanchet and McLean, equal; Cropper, Bowness. *Class II.*—Glassco, Scouler; Mundy and Redpath and Weagant, equal; Cunha and Johnstone, equal; Churchill; Archibald and Livingston, equal; Sharpe; Cockshutt and Fyshe and MacDermot, equal; Jewett; Drinkwater and Macnab, equal; Piché and Sutherland (C. H.), equal; Burpee, Harris, Bain, Findlay. *Class III.*—Pattison, Price, Campbell; Harvie (R.) and Robertson, equal; Wheaton, Eaton, Dickson (G. L.); Hamilton (A. M.) and Hamilton (W.) and Miner, equal; Eadie, Joseph; Batchelder and Idsardi and Ross, equal; Turnbull; Martin and Wright, equal.

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*Supplemental in Analytic Geometry

FIRST YEAR. *(Algebra).—Class I.*—Bell; Lea and McLachlan (D.W.), equal; Durland; McMeekin and Walker, equal; Wilson, Brennan, Jones; Howell and Tupper, equal; Pedley and Sharp, equal; Ewens and MacDonald (P.J.), equal; Anderson. *Class II.*—Turley and Winter, equal; Forbes, Jackson; Gurd and McCuaig and Presner, equal; Landry; Roger and Taylor, equal; Blackader and McDonald, (H.F.), equal; Boyd and Scott, equal; Benedict and Cattanach, equal; Davidson and MacDonald (R.R.), equal; Cole. *Class III.*—Slavin; Brady and Hibbard, equal; Frith and Harding, equal; Newton, Norton, Pickard; Hadley and Slater, equal; Cowen; Burnett and Kirkpatrick and MacKinnon, equal; Hodgson; Black and Corrigan, equal; Loudon and Smith, equal; Leonard; Grier and Mudge and Steedman, equal; Mackay, (R.M.); Conway and Rolland, equal; Harmer, Small.

Dynamics.—Class I.—Forbes and McLachlan (D.W.), equal; Lea, Tupper, Bell, Durland, Brennan; Burnett and Jones, equal; Pedley; Kirkpatrick and Turley, equal; Benedict and Steedman, equal. *Class II.*—Cattanach, Loudon, Sharp; Roger and Walker, equal; Winter, Jackson, Hadley, Davidson; Anderson and Brady, equal; Blackader; Pickard and Slater, equal; Macdonald (R.R.): Ewens and Wilson, equal. *Class III.*—Harvie (J.), Corrigan; MacKinnon and Presner, equal; Conway, Leonard; Greenshields and Macdonald (P.J.) and Mudge, equal; Landry and Smith, equal; Cole, Lemoine, Black, McCuaig and McDonald)H. F.) and McMeekin and Norton, equal; Boyd and Scott, equal; Gurd and Harding and Newton, equal; Cowen and Taylor, equal; Hibbard and Howell, equal.

Geometry—Class I.—Bell, McLachlan (D. W.), Lea, Jones, Durland, Walker, Brennan, Boyd. *Class II.*—Jackson and Pedley, equal: Macdonald (P. J.); Anderson and Sharp, equal; Newton; McCuaig and McLachlin (D.), equal; McMeekin, Forbes, Cattanach, Loudon, Ewens, Kirkpatrick. *Class III.*—Hibbard and Howell and Landry, equal; Blackader and Wilson, equal; Roger, Leonard; Harding and Winter, equal; Dickson, Grier; Greenshields and Scott, equal; *Benedict and Brown, equal; Presner, Conway; *Burnett and Davidson and †MacKay (R. M.) and Pickard, equal; Corrigan and *Gurd and Steedman, equal; Frith and Robb and Taylor, equal; Baylis and Harvie (J.), equal; Hadley and Macdonald (R. R.), equal.

Trigonometry.—Class I.—Bell. McLachlan (D. W.), Lea, Durland. *Class II.*—Anderson, Macdonald (P. J.), Forbes, Jones, Walker, Sharp, McMeekin; Brennan and Pedley, equal; Benedict. *Class III.*—Harding; Hibbard and Turley, equal; Jackson, Cole; Landry and Wilson, equal; Blackader and Brady and Macdonald (R. R.), equal; Boyd and Steedman, equal; Ewens and Roger and Tupper, equal; Burnett and Kirkpatrick and Presner, equal; Greenshields and Hadley and Norton and Pickard, equal; Cattanach and Grier and McDonald (H. F.) and Taylor and Winter, equal; McCuaig and Scott, equal; Howell, Loudon; Mudge and Slater, equal.

MECHANICAL DRAWING.

THIRD YEAR.—*Class I.*—Chambers, Chaplin, Gillies; Cole and McPhee' equal; Kemp and Marrotte and Scott, equal. *Class II.*—Gnaedinger and Wurtele, equal; McCloskey and McDougall (C.H.) and Parlee, equal; Hamilton (A.M.); Dutcher and Piche, equal; McDougall (G.K.), Mundy, Price, Fraser (D.M.) and Wilkes, equal; Drysdale and Ells and Rheaume, equal; Wenger, Cardew, Davis, Greey. *Class III.*—Campbell, Devlin, Deyell; Atkinson and Roffey, equal; Taylor, McMurtry, Martin, Wilson, Sullivan; Carlyle and Grice, equal.

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* *Supplemental in Plane Geometry.*
† *Supplemental in Solid and Conics.*

SECOND YEAR.—*Class I.*—Sutherland (C.), Cropper, Archibald, Burpee. *Class II.*—Jost, Mooney, Gillespie, Johnson; MacDermot and Willard, equal; Boyle and Eaton and Fyshe, equal; Turnbull; Blanchet and Macnab, equal; Churchill and Wheaton, equal; Eadie and Higgins and McMillen, equal; Bowness and Pinch, equal; Cockshutt and Scouler, equal; Cunha and Glassco and Gibbs and Redpath, equal. *Class III.*—Sharpe; McLean and Ross, equal; Batchelder and Joseph, equal; Barclay and McLeish and Wright and Young, equal; Livingston; Dickson (G.L.) and Drinkwater, equal; Campbell; Findlay and Weagant, equal; Miner; Bray and Harris, equal; Hodgson, Irving, Bain, Ritchie, Belanger.

MECHANICAL ENGINEERING.

FOURTH YEAR.—*(Civil, Electrical and Mining Engineering Courses.) Class I.*—Foreman and Robertson, equal; Boright and Gale, equal. *Class II.*—Cumming and Ross, equal; Conklin, Rowlands; Kendall and Lucas, equal; McCaskill; Hall and Stovel equal; McDonald and Pemberton, equal. *Class III.*—Langley, Maclaren; Cole and Rowley and Stokes and Thorpe, equal; Baker and Jones, equal; Cohen and Jennings and Keith and Porcheron, equal; Beck; Blatch and James and Landry and Musgrave (R.), and Reynolds and Rodger and Tilt and Trimingham, equal. *(Mechanical Engineering Course.) Class I.*—Roberts, Brown. *Class II.*—Edgar, McKay, McKergow. *Class III.*—Millar.

METALLURGY.

THIRD YEAR.—*Class I.*—McPhee; Grice and Spencer, equal; LeMaistre. *Class II.*—MacNaughton; Atkinson and McDougall (C.H.), equal; Parlee. *Class III.*—Carlyle and Gnaedinger and McMurtry and Taylor, equal; Webster, Sullivan; Ells and Johnson, equal; Campbell and Davis, equal; Devell.

METALLURGY (ADVANCED).

FOURTH YEAR.—*Class I.*—Robertson. *Class II.*—Tilt; Hall and Rowlands, equal; Pemberton, Kendall.

METALLURGY (IRON, STEEL AND COPPER).

FOURTH YEAR.—*Class I.*—Robertson, Tilt; Hall and Rowlands, equal. *Class II.*—Boright, Stovel, Lucas; McLaren and Gale, equal; Langley. *Class III.*—Kendall and Pemberton and Ross, equal; Cumming and Porcheron and Reynolds, equal; Rowley, Musgrave (R.)

METALLURGY (SILVER, GOLD AND LEAD).

FOURTR YEAR.—*Class I.*—Rowlands, Tilt. *Class II.*—Boright and Hall and Reynolds and Robertson and Rowley, equal; Lucas, Pemberton and Stovel, equal; Gale and MacLaren and Musgrave (R.), equal; Porcheron, Langley. *Class III.*—Kendall, Ross.

MINERALOGY.

THIRD YEAR.—*Class I.*—LeMaistre, Grice, McPhee. *Class II.*—Johnson, Spencer, Parlee, McDougall (C. H.), Ells, Taylor, Chambers. *Class III.*—Gnaedinger; Carlyle and Devell, equal; Webster; Davis and McMurtry, equal; Campbell, Sullivan, Wilson, Atkinson.

MINERALOGY (ADVANCED).

FOURTH YEAR.—*Class I.*—Egleson and Robertson, equal. *Class II.*—Lucas and Rowlands, equal; Musgrave (W. N.); Langley and Rowley, equal; Hall; Gale and Pemberton and Stovel and Tilt, equal; Savage, Crawford. *Class III.*—Maclaren, Musgrave (R.), Boright, Porcheron, Ross, Kendall, Reynolds.

MINERALOGY (DETERMINATIVE).

THIRD YEAR.—*Class I.*—Johnson, Deyell, LeMaistre; Carlyle and McPhee, equal; Chambers. *Class II.*—Parlee; Spencer and Sullivan, equal; Gnaedinger and Webster, equal; McMurtry; Grice and McDougall (C. H.), equal; Wilson. *Class III.*—Ells, Davis; Cameron and Campbell, equal; Atkinson and Taylor, equal.

MINING.

FOURTH YEAR.—*Class I.*—Robertson. *Class II.*—Tilt, Boright, Pemberton, Reynolds, Hall, Stovel, Lucas; Gale and Kendall and Musgrave (R.) and Rowlands, equal. *Class III.*—Maclaren, Ross, Rowley, Porcheron, Langley.

MINING MACHINERY. ALLOYS AND PROBLEMS.

FOURTH YEAR.—*Class I.*—Hall, Robertson, Boright. *Class II.*—Stovel, Reynolds, Rowlands. *Class III.*—Rowley; Lucas and Tilt, equal; Langley; Musgrave (R.) and Ross, equal; Maclaren and Pemberton, equal; Gale, Porcheron, Kendall.

MUNICIPAL ENGINEERING.

FOURTH YEAR.—*Class I.*—None. *Class II.*—Edwards, Jones. *Class III.*—Cohen, Landry.

THIRD YEAR.—*Class I.*—Hogan; Blumenthal and Lawrence, equal; *Class II.*—Harvey, Healy. *Class III.*—Dawe, Kent, Lambart.

ORE DRESSING.

FOURTH YEAR.—*Class I.*—Robertson. *Class II.*—Hall, Boright, Tilt. *Class III.*—Lucas and Musgrave (R.) and Pemberton, equal; Porcheron; Gale and Rowley, equal; Maclaren and Reynolds, equal; Kendall and Rowlands, equal; Ross; Langley and Stovel, equal.

THIRD YEAR.—*Class I.*—McPhee. *Class II.*—Parlee; Chambers and Atkinson and Taylor, equal; Grice, Gnaedinger, Carlyle, McMurtry, Ells, Webster, Campbell; McDougall (C. H.) and Wilson, equal; Davis, Sullivan. *Class III.*—Cameron and Deyell, equal.

PETROGRAPHY.

FOURTH YEAR.—*Class I.*—None. *Class II.*—Robertson, Hall, Rowley. *Class III.*—Boright and Gale and Musgrave (R.) and Rowlands, equal; Langley and Lucas and Pemberton, equal; Stovel, Tilt, Maclaren, Ross; Kendall and Reynolds, equal.

PHYSIOGRAPHY.

FOURTH YEAR.—*Class I.*—None. *Class II.*—Rowley, Ross, Reynolds. *Class III.*—Boright; Lucas and Stovel, equal; Musgrave (R.); Gale and Maclaren, equal; Langley.

PHYSICS.

SECOND YEAR.—(*Electricity and Magnetism.*)—*Class I.*—Boyle, Fyshe Harris, Redpath, Scouler; Findlay and MacDermot, equal. *Class II.*—Johnstone and McLeish and Weagant, equal; Cropper, Kydd, Willard, Archibald, Blanchet; Burpee and Piché, equal; McLean, Mundy; Bain and Jewett and Small, equal; Cunha and Joseph, equal; Drinkwater and Macnab, equal; Spencer and Sutherland (C. H.), equal; Bowness and Eaton and Jost, equal; MacMillen and Robertson, equal; Campbell and Hamilton (W.), equal; Glassco. *Class III.*—Churchill, Wheaton, Bray; Gibbs and Ross and Wright, equal; Baker and Dickson (G. L.), equal; Turnbull, Livingstone, Pattison, Sharpe; Batchelder and Idsardi, equal; Belanger and Cockshutt and Eadie and Gillespie and Higgins and Mooney, equal.

FIRST YEAR.—(*Sound, Heat and Light.*)—*Class I.*—Cattanach; Jones and McLachlan (D. W.), equal; Bell, Jackson, Durland, Turley; Landry and Walker, equal; Hibbard and Winter, equal; Davidson and Pedley, equal; Sharp. *Class II.*—Macdonald (P. J.) and Tupper, equal; Brennan; Presner and Wickware, equal; Blackader and Boyd and Corrigan and Forbes and Lea, equal; Gurd and Kirkpatrick, equal; Black and Hadley and Leonard, equal; Cowen; Brady and Burnett, equal; Anderson and Cole and Pickard, equal; Roger, Steedman; Dickenson and Harding and McMeekin and Taylor, equal; Dickson and Greenshields and Harvie (R.), equal. *Class III.*—McDonald (H. F.) and Norton, equal; Frith and Slater, equal; Benedict and Ewens and Hodge, equal; Harvie (J.); Baylis and Wilson, equal; Howell and Scott, equal; Newton; Conway and Loudon and McCuaig, equal; Shorey, Howe; Brown (W. G. B.) and McKinnon and Smith, equal; MacKay (G. W.) and MacKay (R. M.), equal.

RAILWAY ENGINEERING.

FOURTH YEAR.—*Class I.*—Jones, Edwards. *Class II.*—Landry. *Class III.*—Cohen, Beck.

THIRD YEAR.—*Class I.*—Blumenthal. *Class II.*—Hogan. *Class III.*—Harvey, Lawrence; Dawe and Healy, equal;

SHOPWORK.

FOURTH YEAR.—*Class I.*—McKergow; Brown and McKay and Roberts, equal. *Class II.*— Edgar.

THIRD YEAR.—*Class I.*—Cole and McCloskey, equal; Chaplin, Wenger, Drysdale, Scott; Cardew and Dutcher and Marrotte and Wilkes and Wurtele, equal. *Class II.*—Kemp, McDougall (G. K.); Devlin and Roffey, equal; Greey and Piché, equal

SECOND YEAR.—*Class I.*—Jost; Barclay and Fraser (D. M.) and Weagant, equal; Burpee and Jewett and Johnstone and Wheaton, equal; Macnab and Pattison and Sharpe, equal; Belanger and Mooney, equal; Gibbs and Gillis and McLean, equal; Fyshe and Kydd and Idsardi and Livingston and McIntosh and Skelton, equal. *Class II.*—Higgins and Redpath and Willard, equal; Archibald and Findlay and Wright and Young, equal; Harris and Ross and Turnbull, equal; Bain and Bowness and Churchill and MacDermot, equal; Dickson and Gillespie and Pinch and Sutherland (C. H.), equal; Boyle and Campbell and Cropper and McMillen and Scouler, equal; Cockshutt and Roger and Shaughnessy, equal; Blanchet and Cunha and Drinkwater and Eadie and Joseph and Small and Smith, equal; Bray and Glassco and Miner, equal. *Class III.*—Ryan; Ritchie and Rolland, equal; Eaton.

FIRST YEAR.—*Class I.*—Harvie (J.); Conway and Harvie (R.) and Sharp and Tupper, equal; Dickenson and Durland and Jackson, equal; Forbes; Black and Dickson and Kirkpatrick, equal; *Class II.*—Davidson and Greenshields and Hassberger and Hodge and Small and Winter, equal; Blackader and Boyd and Brennan and Brown (W. G. B.) and Carlyle and Howe and Jardine and Johnson and Jones and Leonard and Loudon and Macdonald (P. J.) and McMeekin and Newton and Presner and Richards and Walker and Wilson and Wickware and Wheaton, equal; Benedict and Brady and Cattanach and Cole and Corrigan and Prevost and Turley, equal; Anderson and Bell and Hadley and Harding and McCuaig and McKinnon and Pickard and Shorey and Taylor, equal; Daly and Ewens and Frith and Gurd and Hibbard and Howell and Mather and Macdonald (R. R.) and Norton and Pedley and Poupore and Slater and Slavin, equal; Beaudry and Cowen and Gaunt and Haskell and Landry and Lea and Lynch and McDonald (H. F.) and McLachlan (D. W.) and Ryan and Scott (W. G.) and Smith, equal; Baylis and Grier and McKay (R. M.) and Phillips and Wright, equal. *Class III.*—Harmer and Simard and Steedman, equal; Burnett, Roy, Robb.

STRUCTURAL DESIGNING.

FOURTH YEAR.—*Class I.*—None. *Class II.*—Jones, Beck, Edwards. *Class III.*—Cohen and Landry, equal.

THIRD YEAR.—*Class I.*—Lambart, Blumenthal, Harvey, Lawrence. *Class II.*—Irving, Dawe, Kent. *Class III.*—Healy, Hogan.

STRUCTURAL ENGINEERING.

FOURTH YEAR.—*Class I.*—None. *Class II.*—None. *Class III.*—Cohen; Beck and Edwards, equal; Jones, Landry.

THIRD YEAR.—*Class I.*—Blumenthal, Lawrence. *Class II.*—Harvey, Kent, Hogan. *Class III.*—Dawe, Healy, Lambart.

SUMMER WORK (ESSAYS).

FOURTH YEAR.—*Class I.*—Conklin and Foreman and Keith and McKay, equal; Brown and Cole and McCaskill and Roberts and Hall, equal; Egleson and Musgrave (R.) and Robertson, equal; Savage. *Class II.*—Boright and Jones and McKergow and Rowlands and Rowley, equal; Baker and Kendall and Lucas and Musgrave (W. N.) and Ross and Tilt, equal; Beck and Gale and James and Stokes, equal; Langley and Cohen and Crawford, equal. *Class III.*—McDonald and Reynolds and Thorpe and Trimingham, equal; Edgar and Landry and Maclaren and Porcheron, equal; Pemberton, Stovel.

THIRD YEAR.—*Class I.*—Chambers and Scott, equal; Carlyle and McDougall (G. K.), equal; Cardew and Drysdale and Harvey and Lambart, equal. *Class II.*—Chaplin and Dutcher and Greey and Kemp and Pippy, equal; Blumenthal and Ells and Gnaedinger and Marrotte and Parlee, equal; Kent and McCloskey, equal; Davis and McPhee and Wenger and Wilkes, equal. *Class III.*—Cole; Gillies and Lawrence and McDougall (C. H.), equal; Dawe; Atkinson and Johnson and LeMaistre, equal.

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* *Supplemental in Field work only.*

SURVEYING.

THIRD YEAR.—*Class I.*—McPhee, Lawrence. *Class II.*—McMurtry; Blumenthal and Grice, equal; Kent, Gnaedinger, Healy, Atkinson. *Class III.*—Chambers, Davis, Taylor, Webster, Harvey, Ells, Carlyle, McDougall (C. H.), Parlee; Hogan and Wilson, equal; *Deyell.

SECOND YEAR.—*Class I.*—Jewett, Kydd; Fyshe and Jost, equal; Churchill. *Class II.*—Livingston, Blanchet, Martin. *Class III.*—Sharpe; Hamilton (A. M.) and Idsardi, equal; Macnab, McIntosh, Lockerby, Hamilton (W.), Ritchie.

SURVEYING FIELDWORK.

SECOND YEAR.—*Class I.*—Jewett, Blanchet, Jost. *Class II.*—Churchill, Livingston, McIntosh, Idsardi, Sharpe, Kydd; Belanger and Young, equal; Bowness, Ritchie. *Class III.*—Miner, Shaughnessy, Rolland.

THEORY OF STRUCTURES.

FOURTH YEAR.—*Class I.*—Edwards. *Class II.*—Cohen, Jones, Landry, Beck.

THIRD YEAR.—*Class I.*—Dutcher, McDougall (C. H.), Chaplin, Grice; Cardew and Lawrence and McDougall (G. K.), equal. *Class II.*—Cole; Parlee and Taylor, equal; Ells and Lambart, equal; Greey and Harvey, equal; Drysdale, McCloskey, Davis, Marrotte; Carlyle and Kent, equal; Healy, Blumenthal. *Class III.*—Chambers and McPhee and Wilson, equal; Wenger, Wilkes, Gnaedinger, Scott, Deyell, Kemp; Roffey and Wurtele, equal; Campbell and Webster, equal; McMurtry, Devlin, Atkinson, Dawe.

THERMODYNAMICS.

FOURTH YEAR.—*Class I.*—Roberts, Brown. *Class II.*—McKergow. *Class III.*—Edgar, McKay.

THIRD YEAR.—*Class I.*—Kemp. *Class II.*—Drysdale; Chaplin and Greey and Robinson (H. G.), equal. *Class III.*—Wilkes.

TRANSPORTATION.

THIRD YEAR.—*Class I.*—Grice, McPhee; Davis and McDougall (C. H.), equal; Chambers and Sullivan, equal; Webster. *Class II.*—Taylor, Martin; Ells and Gnaedinger, equal; Wilson. *Class III.*—Campbell; Atkinson and Parlee, equal; Cameron and Deyell, equal; Carlyle, McMurtry.

Faculty of Medicine.

FINAL YEAR.

PRIZE LIST.

HOLMES GOLD MEDAL, for highest aggregate in all subjects forming the Medical Curriculum.

E. M. McLAUGHLIN, Winona, Minn.

FINAL PRIZE for highest aggregate in the Fourth Year subjects,

F. S. PATCH, B.A., Montreal, Que.

FOURTH YEAR.

HONOURS IN AGGREGATE OF ALL SUBJECTS.

1. Patch, F. S., B.A.
2. Parris, N. D.
3. Nelson, W. E.
4. McLaughlin, E. M.
5. Turner, G. H., B.A.
6. McCulloch, J. M.
7. King, R., B.A.
8. Elder, R., B.A.
9. Burns, A. S., B.A.
10. Bishop, L. C.

SURGERY—HONOURS.

1. Patch, F. S., B.A.
2. Parris, N. D.
   McLaughlin, E. M.
4. McCulloch, J. M.
5. Burns, A. S., B.A.
6. Cowperthwaite, H. H.
7. McLaren, D. D.
8. Turner, G. H., B.A.
9. Ebbett, P. L. B.
   Bishop, L. C.
11. English, J. M.
    Nelson, W. E.
    Townsley, R. H.
14. Thomas, S. B.
15. McKechnie D. W.
16. Douglas, F. C.
17. Macdonald, R. St. J., B.A.
    Rehfuss, W. N., B.A.
19. Ells, R. H.
20. Kissane, J.W.
    Elder R., B.A.
22. Lynch, A. L.
    Slack, M. R.
24. Montgomery, C. H.
25. King, R., B.A.
26. Anderson, C. W., B.A.
    Lamb, W. V.
    Magee, C. F.
29. Forbes, R. D.
    Secord, W. H.

MEDICINE AND CLINICAL MEDICINE.
HONOURS.

1. McCulloch, J. M.
2. Turner, G. H., B.A.
3. McLaughlin, E. M.
4. Patch, F. S., B.A.
5. Thomas, S. B.
6. Strong, N. W., B.A.
7. Macdonald, R. St. J.
8. King, R., B.A.
   Parris, N. D.
10. Forbes, R. D.
11. Bishop, L. C.
12. Nelson, W. E.
13. Anderson, C. W., B.A.
    Laurie, E., B.A.
    Munro, J. H.
16. Burns, A. S., B.A.
17. Elder, R., B.A.
18. McEachern, I. W. T.

CLINICAL SURGERY—HONOURS.

1. McLaughlin, E. M.
2. Nelson, W. E.
3. Parris, N. D.
   Turner, G. H., B.A.
5. Thomas, S. B.
6. Patch, F. S., B.A.
   Rehfuss, W. N., B.A.
8. Burns, A. S.
   Forbes, R. D.
10. Magee, C. F.
11. Freeze, E. H.
    Macdonald, R. St. J., B.A.
    Townsley, R. H.

OPHTHALMOLOGY AND OTOLOGY—HONOURS.

1. Parris, N. D.
2. Patch, F. S., B.A.
3. Church, H. C.
4. Montgomery, C. H.
5. Donnelly, W. H.
6. Nelson, W. E.
7. Taggart, E. A.
8. Maby, W. J.
9. McEwen, J. R., B.A.

SPECIAL PATHOLOGY—HONOURS.

1. King, R., B.A.
2. Strong, N. W., B.A.
3. Elder, R., B.A.
4. Lamb, W. V.
5. Morris, S. C.
6. McLaren, D. D.
7. Ebbett, P. L. B.
   McEwen, J. R,. B.A.
9. McCulloch, J. M.
   Patch, F. S., B.A.
11. O'Neill, J. M.
12. Parris, N. D.
13. Truax, W.
14. Allan, R.
    Ells, R. H., B.A.

GYNAECOLOGY—HONOURS

1. Turner, G. H., B.A.
2. Nelson, W. E.
3. Parris, N. D.
4. English, J. M.
5. Patch, F. S., B.A.
6. Bishop, L. C.
7. King, R., B.A.
   Warren, J. G.
9. Elder, R., B.A.
10. Anderson, C. W., B.A.
    Freeze, E. H.
12. Townsley, R. H.
13. Fortin, C. E. F., B.A.
14. Slack, M. R.
15. Ells, R. H., B.A.

OBSTETRICS—HONOURS.

1. Bishop, L. C.
2. Campbell, W. G.
3. Church, H. C.
   Cumming, W. G., B.A.
5. Nelson, W. E.
6. Munro, J. H.
7. McCulloch, J. M.
8. Patch, F. S., B.A.
   Peterson, G. R.

PASS LIST.

FINAL SUBJECTS.

The following gentlemen, 100 in number, have fulfilled all the requirements to entitle them to the degree of M.D., C.M., from the University. In addition to the primary subjects they have passed a satisfactory examination, both written and oral, in the following subjects:—Principles and Practice of Surgery, Theory and Practice of Medicine, Obstetrics and Diseases of Women and Children, Pharmacology and Therapeutics, Medical Jurisprudence, Practical and General Pathology, Bacteriology and Hygiene; and also clinical examinations in Medicine, Surgery, Obstetrics, Gynæcology and Ophthalmology conducted at the bedside in the hospital:—

Allan, R.. .. .. Montreal.
Allum, A. W.. .. .. Renfrew.
Anderson, C. W., B.A.. .. .. Halifax, N.S.
Andrews, J. J.. .. .. St. Lambert, Que.
Bishop, G. A.. .. .. Kinburn, Ont.
Bishop, L. C.. .. .. Marbleton, Que.
Blair, A. K.. .. .. Chicoutimi, Que.
Boulter, J. H., B.A.. .. .. Picton, Ont.
Boyd, O.. .. .. Russell, Ont.
Boyd, R. M... .. .. Belleville, Ont.
Brooks, J. E., B.A... .. .. Eastport, Maine.
Burns, A. S., B.A.. .. .. Boston, Mass.
Campbell, W. G.. .. .. Brantford, Ont.
Chamberlain, H. B.. .. .. Montreal, Que.
Chandler, E. C.. .. .. Montreal, Que.
Chaplin, H. L. S.. .. .. St. John's, Newfoundland.
Church, H. C.. .. .. Chelsea, Que.
Cowperthwaite, H. H... .. .. St. John's, Newfoundland.
Croft, L. V., B.A.. .. .. Middleville, Ont.
Cumming, W. G., B.A.. .. .. Montreal, Que.
Dickson, A. J., B.A.. .. .. Goderich, Ont.
Donnelly, W. H.. .. .. Ogdensburgh, N.Y.
Douglas, F. C.. .. .. Montreal, Que.
Doyle, F. H.. .. .. Natick, Mass.
Ebbett, P. L. B.. .. .. Gagetown, N.B.
Elder, R., B.A.. .. .. Trout River, Que.
Ells, R. H., B.A... .. .. Ottawa, Ont.

English, J. M.. .. .. New Westminster, B.C.
Ferguson, W. H.. .. .. St. Thomas, Ont.
Forbes, R. D.. .. .. Stratford, Ont.
Fortin, C. E. F., B.A.. .. .. Winnipeg, Man.
Freeze, E. H.. .. .. Penobsquish, N.B.
Frost, A. C.. .. .. Montreal, Que.
Gale, W. P... .. .. Quebec, Que.
Gilmour, C. R.. .. .. Brockville, Ont.
Hansen, N. C., M.A.. .. .. Portland, Maine.
Hardisty, R. H. M., B.A.. .. .. .. Montreal, Que.
Horsfall, F. L., B.A.. .. .. Montreal, Que.
Hynes, W. T.. .. .. Darnley, P.E.I.
Kenny, R. W.. .. .. Ottawa, Ont.
King, R., B.A.. .. .. Sackville, N.B.
Kissane, J. W.. .. .. Chataguay, N.Y.
Lamb, W. V.. .. .. St. Andrews, N.B.
Laurie, Ernest, B.A.. .. .. Montreal, Que.
Lundie, J. A., B.A.. .. .. Montreal, Que.
Lyman, W. S., Ph.B.. .. .. Knoxville, Tenn., U.S.A.
Lynch, A. L.. .. .. Ottawa, Ont.
Macdonald, R. St. J., B.A.. .. .. .. Bailey's Brook, N.S.
Mackenzie, W. A.. .. .. Wood Islands, P.E.I.
MacKinnon, I. W. .. .. Charlottetown, P.E.I.
McCulloch, J. M.. .. .. Durham, Ont.
McDiarmid, C. A.. .. .. Kemptville, Ont.
McDonald, P. A., B.A... .. .. Dundee Centre, Que.
McDonald, S. H., B.A.. .. .. St. John, N.B.
McEachern, I. W. T... .. .. Rockland, Ont.
McEwen, J. R., B.A.. .. .. Dewittville, Que.
McGrath, F. C.. .. .. Norway, P.E.I.
McGuigan, J. D.. .. .. Kelly's Cross, P.E.I.
McKechnie, D. W.. .. .. Dundas, Ont.
McIntosh, H. H.. .. .. Montreal, Que.
McIntosh, J. A... .. .. Vankleek Hill, Ont.
McLaren, D. D.. .. .. Russell, Ont.
McLaughlin, E. M.. .. .. Winona, Minn.
McPherson, Thos., B.A.. .. .. Stratford, Ont.
Maby, W. J.. .. .. Cohoes, N.Y.
Magee, C. F.. .. .. North Gower, Ont.
Meindl, A. G.. .. .. Mattawa, Ont.
Mitchell, I. E., B.A.. .. .. Sherbrooke, Que.
Montgomery, C. H.. .. .. St. John, N.B.
Morris, S. C.. .. .. Wallace, N.S.
Munroe, H. B., B.A.. .. .. Almonte, Ont.
Munroe, H. E.. .. .. St. Elmo, Ont.

Munro, J. H.. .. .. Maxville, Ont.
Murray, J. S.. .. .. St. John, N.B.
Nelson, J. S.. .. .. Ottawa, Ont.
Nelson, W. E.. .. .. Montreal, Que.
O'Brien, C. W., B.A.. .. .. Montreal, Que.
O'Neill, J. M.. .. .. Massera, N.Y.
Parris, N. D.. .. .. Highlands, Barbadoes, W.I.
Patch, F. S., B.A.. .. .. Montreal, Que.
Pavey, H. L.. .. .. Londor, Ont.
Peterson, G. R.. .. .. Toys Hill, Ont.
Puddington, B. A.. .. .. St. John, N.B.
Rehfuss, W. N., B.A... .. .. Bridgewater, N.S.
Saunders, W. E.. .. .. Woodstock, N.B.
Scott, W.. .. .. Montreal, Que.
Secord, W. H.. .. .. Brantford, Ont.
Shaw, D. Le B.. .. .. Portland, Me.
Slack, M. R.. .. .. Farnham, Que.
Steeves, E. O.. .. .. Upper Sackville, N.B.
Stowell, F. E.. .. .. Worcester, Mass.
Strong, N. W., B.A.. .. .. Cambria, Que.
Taggart, E. A.. .. .. Ottawa, Ont.
Thomas, S. B.. .. .. Barbadoes, B.W.I.
Townsley R. H.. .. .. Montreal, Que.
Truax, W.. .. .. Farnham, Que.
Turner, G. H., B.A.. .. .. Baie Verte, N.B.
Warren, J. G.. .. .. Montreal, Que.
White, S. G.. .. .. Ottawa, Ont.
Wilson, A.. .. .. Russell, Ont.

THIRD YEAR.

PIZE LIST.

THIRD YEAR PRIZEMAN,

J. L. ROBINSON, of St. Marys, Ont.

SUTHERLAND MEDALLIST,

J. GRAHAM WILLMORE, of Montreal, Que.

McGILL MEDICAL SOCIETY SENIOR PRIZES:

D. W. MCKECHNIE, First Prize.

W. G. CAMPBELL, Second Prize.

HONOURS IN AGGREGATE OF ALL SUBJECTS.

1. Robinson, J. L.
2. Nutter, J. A. B.A.
3. Fyshe, J. C., A.B.
4. Willmore, J. G.
5. Charman, F. D.
6. Atkinson, H. S.
7. Yorston, F. P., M.A.
8. Sellery, A. C.
9. Chipman, W. W.

HONOURS IN CLINICAL CHEMISTRY.

1. Miller, V. L., B.A.
2. Sellery, A. C.
   Wood, W. H.
4. Douglas, E., B.A.
   Fisher, E. M.
   Greenwood, W. T.
   McLachlan, D. C.
   Yorston, F. P., M.A.
9. Stewart, J. A.
10. Lincoln, W. A.
    Robinson, J. L.
12. Arnold, D. R,, B.A.
    Black, J. C.
    Lauchland, L. C., B.A.
    McLeod, W. A.
    Nelles, T. R. B.
    Richardson, C. A.
    Rogers, J. T., B.A.
    Wood, H. G.
20. Ainley, W. E.
    Charman, F. D.
    Folkins, C. G.
    Fraser, S.
    Graham, R. W.
    Hogan, F. J.
    Keys, M. J.
    MacKid, L. S.
    Nutter, J. A., B.A.
    Styles, W. A. L.
    Winfrey, W. C., B.L.
    Wright, G. A.
32. Chipman, W. W.
    Coffin, J. W.
    Fyshe, J. C., A.B.
    Hotchkiss, E. A.
    Lippiatt, H. T.
    McKenty, F.
    Richardson, C. A. C., B.A.
    White, P. G.

HONOURS IN HYGIENE.

1. Chipman, W. W.
2. Willmore, J. G.
3. Nutter, J. A., B.A.
4. Robinson, J. L.
5. McIntosh, L. de C.
6. Yorston, F. P., M.A.
7. Lincoln, W. A.
8. Lippiatt, H. T.
9. McKenty, F.
   Stewart, J. A.
11. Miller, V. L., B.A.
12. Chisholm, H. A.
13. Dillon, W. P.
14. Cook, W. J.
    McLachlan, D. C.
16. Charman, F. D.
    Rankin, A. C.
18. Howitt, H. O.
19. Markson, S. M.

HONOURS IN GENERAL PATHOLOGY.

1. Fyshe, J. C., A.B.
2. Nutter, J. A., B.A.
3. Robinson, J. L.
4. Willmore, J. G.
5. Charman, F. D.
6. Faulkner, J. A.
7. Coffin, J. W.
8. Yorston, F. P., M.A.
9. Crowell, B. C., B.A.
10. Kerr, H. H.
11. Grant, N. P.
12. Chipman, W. W.
13. Alford, J. H.
    Martin, J. C.
    Meakins, J. C.
16. Murphy, H. H., B.A.
17. Howitt, H. O.
18. Sellery, A. C.

HONOURS IN OBSTETRICS.

1. Murphy, H. H., B.A.
2. Atkinson, H. S.
   Coffin, J. W.
   Robinson, J. L.
   Sellery, A. C.
   Stewart, J. A.
7. Charman, F. D.
   Crowell, B. C., B.A.
   Gibson, G. M.
   Gillis, J. E.
11. Fraser, S.
    Fyshe, J. C., A.B.
13. Alford, J. H.
    Dillon, W. P.
    Hotchkiss, E. A.
    Rankin, A. C.
17. Ainley, W. E., B.A.
    Chipman, W. W.
    Keys, M. J.
    Lippiatt, H. T.
    McIntosh, L. de C.
28. Faulkner, J. A., B.A.
    Fisher, E. M.
    Gibson, R.
    Harrison, L. L., B.A.
    Johnson, J. G. W., M.A.
    White, P. G.
34. Grant, N. P.
    Price, Jos.
    Yorston, F. P., M.A.
37. Cook, W. J.
    Greenwood, W. T.
    Kerr, H. H.
    Nutter, J. A., B.A.
    Preston, C. E.
    Rogers, J. T., B.A.
    Wilson, O. M.
44. Douglas, E., B.A.
45. Bonin, R. P.
    Howitt, H. O.
    Richardson, C. A. C., B.A.
    Smith, W. A., B.A.

HONOURS IN OBSTETRICS.

McKenty, F.
McLachlan, D. C.
Martin, J. C.
25. Gilroy, J. R.
Losier, A. J.
Warwick, W.

49. Dunn, J. F.
Gormely, J. C.
Willmore, J. G.
Wood, W. H.
Wright, G. A.

HONOURS IN CLINICAL SURGERY.

1. Willmore, J. G.
2. McKenty, F.
3. Yorston, F. P., M.A.
4. Dillon, W. P.
Eaton, C. E.
Faulkner, J. A., B.A.
Ford, H. S.
Fyshe, J. C., A.B.
Losier, A. J.
Wilson, T. R., B.A.
11. Charman, F. D.
Crowell, B. C., B.A.
Douglas, E., B.A.
Fraser, S.
Harrison, L. L., B.A.
Keys, M. J.
Lincoln, W. A.
MacKid, L. S.
Miller, V. L., B.A.
Nutter, J. A., B.A.
Reford, L. L., B.A.
Robinson, J. .L
Wright, G. A.

24. Crack, I. E., B.A.
Dunn, J. F.
Gibson, R.
Gillis, J. E.
Gormely, J. C.
Lippiatt, H. T.
Martin, J. C.
Meakins, J. C.
Miller, C.
Murphy, H. H., B.A.
Rogers, J. T., B.A.
Stewart, J. A.
Wood, H. G.
Wood, W. H.

HONOURS IN CLINICAL MEDICINE.

1. Robinson, J. L.
2. Atkinson, H. S.
White, P. G.
Yorston, F. P., M.A.
5. Ainley, L. T., B.A.
Nutter, J. A., B.A.
Reford, L. L., B.A.
Wood, H. G.
9. Charman, F. D.
10. Coffin, J. W.
Rankin, A. C.
Rogers, J. T., B.A.
13. Sellery, A. C.
14. Chipman, W. W.

15. Grant, N. P.
Richardson, C. A.
17. Gibson, G. M.
Gillis, J. E.
Graham, R. W.
Harrison, .L L., B.A.
Meakins, J. C.
22. Howitt, H. O.
23. Stewart, J. A.
24. Cook, W. J.
Crack, I. E. B.A.
Fraser, S.
McKenty, F.
Preston, C. E.

HONOURS IN BACTERIOLOGY.

1. Fyshe, J. C., A.B.
2. Lippiatt, H. T.
   Nutter, J. A., B.A.
4. Alford, J. H.
   Sellery, A. C.
6. Robinson, J. L.
7. Coffin, J. W.
   McIntosh, L. de C.
9. Atkinson, H. S.
   Miller, V. L., B.A.
11. Dillon, W. P.
    Rogers, J. T., B.A.
13. Faulkner, J. A., B.A.
    McKenty, F.
    Yorston, F. P., M.A.
16. Wood W. H.
17. Lincoln, W. A.
    Stewart, J. A.
19. Harrison, L. L., B.A.
    Reford, L. L., B.A.

HONOURS IN PHARMACOLOGY.

1. Robinson, J. L.
2. Fyshe, J. C., A.B.
3. Atkinson, H. S.
   Nutter, J. A., B.A.
5. Miller, V. L., B.A.
6. Charman, F. D.
7. Ernandez, J. A.
8. Lincoln, W. A.
9. McKenty, F.
10. McKenzie, R. P.
    White, P. G.
12. Chipman, W. W.
13. Richardson, C. A.
14. Cook, W. J.
15. Fraser, S.
    Grant, N. P.
17. Rankin, A. C.
18. Stewart, J. A.

HONOURS IN MEDICAL JURISPRUDENCE

1. Nutter, J. A., B.A.
2. Atkinson, H. S.
   Willmore, J. G.
4. Fyshe, J. C., A.B.
   Rankin, A. C.
6. Chipman, W. W.
   Gillis, J. E.
   Lippiatt, H. T.
   Robinson, J. L.
10. Charman, F. D.
    Coffin, J. W.
    Faulkner, J. A., B.A.
    Gibson, G. M.
    Harrison, L. L., B.A.
    Markson, S. M.
    Miller, V. L., B.A.
    Murphy, H. H., B.A.
    Rogers, J. T., B.A.
    Sellery, A. C.

THIRD YEAR PASS LIST

All Subjects.

The following students, 106 in number, have passed in all the subjects of the Third Year, viz.:—Pathology, Pharmacology and Therapeutics, Hygiene and Bacteriology, Medical Jurisprudence, Medicine, Surgery, Clinical Chemistry and Obstetrics.

Ainley, L. T., B.A.
Ainley, W. E., B.A.
Alford, J. H.
Allum, A. W.
Atkinson, H. S.
Bailey, G. W.
Bentley, J. S., B.A.
Black, J. C.
Blair, A. K.
Blakeman, F. W.
Bonin, R. P.
Boyd, O.
Boulter, J H., B.A.
Briggs, J. A.
Brooks, J. E., B.A.
Carnochan, W. L.
Chamberlain, H. B.
Chandler, A. C.
Chaplin, H. L. S.
Charman, F. D.
Chipman, W. W.
Church, H. C.
Coffin, J. W.
Cook, W. J.
Crack, I. E., B.A.
Cram, W. J.
Crowell, B. C., B.A.
Cumming, W. G.
Davidson, H. D. J.
Dickson, W. H.
Dillon, W. P.
Douglas, E., B.A.
Eaton, C. E.
Faulkner, J. A., B.A.
Fisher, E. M.
Folkins, C. G.
Ford, H. S.
Fraser, S.
Kerr, H. H.
Keys, M. J.
Lauchland, L. C., B.A.
Lincoln, W. A.
Lippiatt, H. T.
Losier, A. J.
Macdonald, R. St. J., B.A.
MacKenzie, A. B.
MacKenzie, W. A.
McDiarmid, C. A.
McDonald, S. H.
McEachern, I. W. T.
McGuigan, J. D.
McIntosh, L. de C.
McKenty, F.
McKenzie, R. P.
McLachlan, D. C.
Martin, J. C.
Meakins, J. C.
Miller, C.
Miller, V. L., B.A.
Munro, J. H.
Murphy, H. H., B.A.
Murray, J. S.
Nagle, S. M.
Nelson, J. S.
Ness, W.
Nutter, J. A., B.A.
Park, A. W.
Preston, C. E.
Quain, B. P.
Rankin, A. C.
Reford, L. L., B.A.
Richardson, C. A.
Richardson, C. A. C., B.A.
Robinson, J. L.

Fyshe, J C., A.B.
Gibson, G. M.
Gibson, R.
Gillis, J. E.
Gilmour, C. R.
Gilroy, J. R.
Gormeley, J. C.
Gow, R. J.
Grant, N. P.
Greenwood, W. T.
Harrison, L. L., B.A.
Howitt, H. O.
Hutchinson, J. W.
Johnson, J. G. W., M.A.
Judson, A. H.
Kenny, R. W.
Rogers, J. T., B.A.
Scott, Walter.
Sellery, A. C.
Smith, C. M.
Stewart, J. A.
Steeves, E. O.
Stowell, F. E.
Warren, J. G.
Warwick, W.
White, P. G.
Willmore, J. G.
Wilson, A.
Wood, H. G.
Wood, W. H.
Wright, G. A.
Yorston, F. P., M.A.

In addition to those whose names appear on the above list, as having passed in all the subjects of the Third Year, the following have passed in:—

PHARMACOLOGY.

Arnold, D. R., B. A.
Dunn, J. F.
Ernandez, J. A.
Gillis, J. H.
Hogan, F. J.
Hotchkiss, E. A.
Markson, S. M.
Price, Jos.
Smith, W. A., B.A.
Wigle, C. A.
Wilson, T. R., B.A.
Winfrey, W. C., B.L.

PATHOLOGY.

Arnold, D. R., B.A.
Crosby, P. C.
Dunn, J. F.
Gillis, J. H.
Graham, R. W.
Hogan, F. J.
Hotchkiss, E. A.
Inksetter, F. S.
MacKid, L. S.
Markson, S. M.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B.A.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A.

HYGIENE.

Chisholm, H. A.
Crosby, P. C.
Graham, R. W.
Hogan, F. J.
Hotchkiss, E. A.
McLeod, W. A.
Markson, S. M.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B.A.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A

MEDICAL JURISPRUDENCE.

Arnold, D. R., B.A.
Dunn, J. F.
Ernandez, J. A.
Gill, F. D. B.
Hogan, F. J.
Hotchkiss, E. A.
Inksetter, F. S.
McDonald, J. C.
MacKid, L. S.
McLeod, W. A.
Markson, S. M.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B. A.
Waterman, C.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. A., B.A.
Winfrey, W. C., B.L.

CLINICAL MEDICINE.

Arnold, D. R., B.A.
Crosby, P. C.
Dunn, J. F.
Ernandez, J. A.
Graham, R. W.
Hotchkiss, E. A.
MacKid, L. S.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Shillington, R. N. W.
Wilson, O. M.
Winfrey, W. C., B.L.

CLINICAL SURGERY.

Arnold, D. R., B.A.
Crosby, P. C.
Dunn, J. F.
Ernandez, J. A.
Graham, R. W.
Hogan, F. J.
MacKid, L. S.
McLeod, W. A.
Markson, S. M.
Price, Jos.
Rilance, C. D.
Shillington, R. N. W.
Smith, W. A., B.A.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. B., B.A.
Winfrey, W. C., B.L.

CLINICAL CHEMISTRY.

Arnold, D. R., B.A.
Chisholm, H. A.
Dunn, J. F.
Ernandez, J. A.
Gill, F. D. B.
Gourley, H. B., B.A.
Graham, R. W.
Hogan, F. J.
Hotchkiss, E. A.
McDonald, J. C.
MacKid, L. S.
McLeod, W. A.
Markson, S. M.
Nelles, T. R. B.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B.A.
Sweeney, J. L., B.A.
Styles, W. A. L.
Waterman, C.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. B., B.A.
Winfrey, W. C., B.L.

OBSTETRICS.

Arnold, D. R., B.A.
Crosby, P. C.
Dunn, J. F.
Ernandez, J. A.
Graham, R. W.
Hogan, F. J.
Hotchkiss, E. A.
Inksetter, F. S.
MacKid, L. S.
McLeod, W. A.
Markson, S. M.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B.A.
Wigle, C. A.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. B., B.A.
Winfrey, W. C., B.L.

BACTERIOLOGY.

Dunn, J. F.
Ernandez, J. A.
Graham, R. W.
Hogan, F. J.
Hotchkiss, E. A.
MacKid, L. S.
McLeod, W. A.
Markson, S. M.
Price, Jos.
Rilance, C. D.
Sims, H. A.
Smith, W. A., B.A.
Sweeney, J. L., B.A.
Styles, W. A. L.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. B., B.A.
Winfrey, W. C., B.L.

SECOND YEAR.

PRIZES AND HONOURS.

SECOND YEAR PRIZEMAN,
H. C. MERSEREAU, Doaktown, N.B.

SENIOR ANATOMY PRIZE,
H. C. MERSEREAU, Doaktown, N.B.

McGILL MEDICAL SOCIETY JUNIOR PRIZES:
D. L. S. LIKELY, B.A., First Prize.
L. DE C. McINTOSH, Second Prize.

HONOURS IN AGGREGATE OF ALL SUBJECTS.

1. Mersereau, H. C.
2. MacDermot, J. H.
3. Tees, F. J., B.A.
4. Scrimger, F. A. C., B.A.
5. Leslie, H. A.
6. Moffatt, C. F., B.A.
7. Dykes, J. W.
8. Nelles, T. R. B.
9. Henderson, E. H., B.A.
10. Burgess, H. C.
11. Soady, J. H., B.A.
12. Likely, D. S., B.A.
13. Robertson, B. W.

PHYSIOLOGY—HONOURS.

1. Mersereau, H. C.
2. Tees, F. J., B.A.
3. MacDermot, J. H.
4. Moffatt, C. F., B.A.
5. Nelles, T. R. B.
6. Scrimger, F. A. C., B.A.
7. Leslie, H. A.
8. Burgess, H. C.
9. Cumming, A., B.A.
   Dykes, J. W.
   Hanington, J. W. B.

PRACTICAL CHEMISTRY—HONOURS.

1. MacDermot, J. H.
   Young, C. A.
3. Leslie, H. A.
4. Munro, J. A.
   Sullivan, J. A.
   Tees F. J., B.A.
7. Dougan, B. H.
   Lindsay, E. A.
   Mason, J. H.
   Wilkinson, W. M.
14. McMeekin, R. J., M.D.
    Robertson, A. R.
16. Moffatt, C. F., B.A.
17. Dowler, W. H.
    Keddy, O. B.
19. Burgess H. C.
20. Scrimger, F. A. C., B.A.
21. Waterman, C.
22. Ralph, A. J., Ph.B.
23. Mersereau, H. C.

PRACTICAL HEMISTRY—HONOURS.

11. Cumming, A., B.A.
Henderson, E. H., B.A.
Weldon, R. C., Jr.

24. Dykes, J. W.
Hanington, J. W. B.
Miller, A. P.
Pruyn, W. G., B.A.

28. Mulligan, J. W.

HISTOLOGY—HONOURS.

1. Tees, F. J., B.A.
2. MacDermot, J. H.
3. Cumming, A., B.A.
4. Brown, G. T.
5. Alguire, A. R.
Leslie, H. A.
McMeekin, R. J., M.D.
8. Hanington, J. W. B.
Mersereau, H. C.
Moffatt, C. F., B.A.
Scrimger, F. A. C., B.A.
12. McLean, J. D.
Tull, J. A. C.

14. Brown, F. F.
Dougan, B. H.
Dykes, J. W.
Hanington, D. P.
Henderson, E. H., B.A.
Nelles, T. R. B.
Robertson, B. W.
Sullivan, J. A.
Turnbull, E. G.
23. Likely, D. S., B.A.
Miller, A. P.
Mohr, F. W. C.
Muckleston, H. S., M.A.
Petersky, S.
Robertson, A. R.
Ryan, F. McD., B.A.
Soady, J. H., B.A.

ORGANIC CHEMISTRY—HONOURS.

1. Likely, D. S., B.A.
2. Pruyn, W. G., B.A.
3. Mersereau, H. C.
Moffatt, C. F., B.A.
5. MacDermot, J. H.
Shaw, R. M.
7. Viner, N., B.A.
8. Dykes, J. W.
Paterson, W. J., B.A.
Tees, F. J., B.A.
11. Leslie, H. A.
Soady, J. H., B.A.
13. Hanington, J. W. B.
14. McNaughton, W. B.
Walker, J. J., B.A.
16. Brown, G. T.
Cumming, A., B.A.

23. McMurtry, S. O., B.A.
24. Dudderidge, C. R., B.A.
Wood, G. O.
26. Finigan, J. F.
Henderson, E. H., B.A.
Robertson, B. W.
Sullivan, J. A.
30. Scott, W. J., B.A.
Tierney, J. E.
Weldon, R. C.
33. Chandler, H. B.
Mabee, O. R., Ph.B.
Muckleston, H. S., M.A.
36. Ralph, A. J., Ph.B.
Sinclair, E. C.
36. Valin, R. E.
Young, C. A.

ORGANIC CHEMISTRY—HONOURS.

Scrimger, F. A. C., B.A.
19. Loggie, W. S.
20. Burgess, H. C.
Mercer, T. C.
Tull, J. A. C.
40. Hume, G. M.
Miller, A. P.
42. McDonald, J. A., B.A.
Ryan, F. McD., B.A.

INORGANIC CHEMISTRY—HONOURS.

1. MacDermot, J. H.
2. Leslie, H. A.
3. Scrimger, F. A. C., B.A.
4. Likely, D. S., B.A.
5. McDonald, J. A., B.A.
6. Pruyn, W. G., B.A.
7. Mersereau, H. C.
8. Dudderidge, C. R., B.A.
9. Robertson, B. W.
10. Sullivan, J. A.
Turnbull, E. G.
12. Tees, F. J., B.A.
13. Soady, J. H., B.A.
14. McNaughton, W. B.
15. Henderson, E. H., B.A.
Valin, R. E.
17. Muckleston, H. S., M.A.
18. Dykes, J. W.
19. Moffatt, C. F., B.A.
20. Hanington, J. W. B.
McMurtry, S. O., B.A.
22. Mercer, T. C.
Ryan, F. McD.

ANATOMY—HONOURS.

1. Mersereau, H. C.
2. MacDermot, J. H.
3. Burgess H. C.
McMeekin, R. J., M.D.
5. Scrimger, F. A. C., B.A.
6. Tull, J. A. C.
7. Henderson, E. H., B.A.
8. Dykes, J. W.
9. Tees, F, J., B.A.
10. Muckleston, H. S., M.A.

PHARMACOLOGY—HONOURS.

1. Moffatt, C. F., B.A.
2. Dykes, J. W.
3. Soady, J. H., B.A.
4. Nelles, T. R. B.
5. Robertson, B. W.
Tees, F. J., B.A.
7. Alguire, A. R.
Henderson, E. H., B.A.
Leslie, H. A.
10. Mersereau, H. C.
11. Tull, J. A. C.
12. Mercer, T. C.
Viner, N.
14. Young, C. A.
15. Richards, E. T. F.
16. McMeekin, R. J., M.D.
17. Burgess, H. C.
Likely, D. S.
Mackay, M. E.
Scrimger, F. A. C., B.A.
21. Dudderidge, C. R., B.A.
Hume, G. M.
MacDermot, J. H.
Margolese, O.
Ryan, F. McD.
26. Covernton, C. F.
Hanington D. P.
Mason, J. H.
Scott, W. J.

SECOND YEAR PASS LIST.

All Subjects.

The following gentlemen, 82 in number, have completed their Second Year Examinations, which comprise the following subjects:--Anatomy, Practical Anatomy, Chemistry, Practical Chemistry, Physiology, Practical Physiology, Histology and Materia Medica.

Alford, J. H.
Alguire, A. R.
Brown, F. F.
Burgess, H. C.
Carnochan, W. L. C.
Chisholm, H. A., B.A.
Connor, E. L.
Costello, J. W. W. B.A.
Crosby, P. C.
Cumming, A., B.A.
Davidson, H. D.
Dougan, B. H.
Dowler, W. H.
Dudderidge, C. R., B.A.
Dykes, W.
Ferguson, W. H.
Finigan, J. F.
Fortin, C. E. F., B.A.
Gibson, G. M.
Gibson, R.
Gilroy, J. R.
Graham, R. W.
Grimmer, R. D.
Hanington, D. P.
Harrison, L. L., B.A.
Heagerty, J. J.
Henderson, E. H., B.A.
Hogan, F. J.
Horsfall, F. L., B.A.
Hume, G. M.
Hynes, W. T.
Judson, A. H.
Leslie, H. A.
Likely, D. S., B.A.
Lundie, J. A.
MacDermot, J. H.
McNaughton, W. B.
Markson, S. M.
Margolese, O.
Mason, J. H.
Mercer, T. C.
Mersereau, H. C.
Miller, A. P.
Mohr, F. W. C.
Moffatt, C. F., B.A.
Muckleston, H. S., M.A.
Mulligan, J. W.
Munro, J. A.
Nagle, S. M.
Nelles, T. R. B.
Prendergast, A. R., B.A.
Price, J. O.
Pruyn, W. G., B.A.
Richards, E. T. F.
Richardson, C. A. C., B.A.
Robertson, A. R.
Robertson, B. W.
Ryan, F. McD., B.A.
Scott, W. J., B.A.
Scrimger, F. A. C., B.A.
Sims, H. A.
Sinclair, E. E.
Soady, J. H., B.A.
Styles, W. A. L.
Sullivan, J. A.
Tees, F. J., B.A.
Tierney, J. E.
Tull, J. A. C.
Turnbull, E. G.
Valin, R. E.
Viner, N., B.A.
Warwick, W.

McDonald, J. A., B.A.
McIntosh, G. J.
McMeekin, R. J., M.D.
McMurtry, S. O., B.A.
McMurtry, W. C.
Wilson, O. M.
Wilson, T. R., B.A.
Winder, J. B., B.A.
Winfrey, W. C., B.L.
Wood, H. G.
Young, C. A.

In addition to those whose names appear on the above list, as having passed in all the subjects of the Second Year, the following have passed in:—

PHARMACY.

Bonelli, J. V., B.A.
Brown, G. T.
Cameron, A. B.
Covernton, C. F.
Duggan, R. G.
Gaudet, E. A., B. A.
Hanington, J. W. B.
Henry, E. G., B.A.
Hewitt, T. J.
King, J. L.
King, S. S.
Loggie, W. S.
MacDonald, J. P
MacKay M. E.
MacLean, J. D.
McMicking, A. E. T.
Petersky, S.
Raftery, C. R.
Rommel, E.
Sawyer, A. R.
Somerville, H. A.
Wilkinson, W. M.
Wood, G. O.
Wotherspoon, H. C.

PHARMACOLOGY.

Covernton, C. F.
Ewart, D.
Folkins, C. G.
Hanington, J. W. B.
Henry, E. G., B.A.
King, S. S.
Loggie, W. S.
Mackay, M. E.
McMicking, A. E. T.
Rilance, C. D.
Rommel, E.
Sawyer, A. R.
Somerville, H. A.
Wilkinson, W. M.
Wood, G. O.

HISTOLOGY.

Auld, J. W.
Bonelli, J. V., B.A.
Brown, G. T.
Covernton, C. F.
Duggan, R. G.
Gaudet, E. A., B.A.
Gill, F. D.
Hanington, J. W. B.
Henry, E. G., B.A.
Joughins, J. L.
King, J. L.
King, S. S.
Loggie, W. S.
MacDonald, J. P.
MacKay, M. E.
MacLean, J. D.
McLeod W. A.
McMicking, A. E. T.
Petersky, S.
Rommel, E.
Sawyer, A. R.
Somerville, H. A.
Wilkinson, W. M.
Wood, G. O.

ANATOMY.

Auld, J. W.
Brown, G. T.
Cameron, A. B.
Ewart, D.
Fairie, J. A.
King S. S.
Loggie W. S.
MacDonald, J. P.
MacLean, J. D.
McDonald, J. C.
McMicking, A. E. T.
Petersky, S.
Wood, G. O.

PHYSIOLOGY.

Auld, J. W.
Brown, G. T.
Covernton, C. F.
Ewart, D.
Hanington, J. W. B.
Henry, E. G., B.A.
Hewitt, T. J.
King, S. S.
Loggie W. S.
MacDonald, J. P.
MacKay, M. E.
MacKid, L. S.
MacLean, J. D.
McDonald, J. C.
McLeod, W. A.
Petersky, S.
Rommel, E.
Sawyer, A. R.
Somerville, H. A.
Sweeney, J. L., B.A.
Wilkinson, W. M.
Wood, G. O.

INORGANIC CHEMISTRY.

Ewart, D.
Hanington, J. W. B.
Henry, E. G., B.A.
Loggie, W. S.
MacKay, M. E.
MacLean, J. D.
Paterson, W. J., B.A.
Petersky, S.
Ralph, A. J., Ph.B.
Rommel, E.
Somerville, H. A.
Waterman, C.
Wilkinson, W. M.
Wood, G. O.

PRACTICAL CHEMISTRY.

Auld, J. W.
Brown, G. F.
Ewart, D.
Folkins, C. G.
Garcelon, W. S., B.A.
Hanington, J. W. B.
Hewitt, T. J.
Keddy, O. B.
Lindsay, E. A.
MacDonald, J. P
MacKay, M. E.
MacLean, J. D.
McDonald, J. C.
McLeod, W. A.
McMicking, A. E. T.
Raftery, C. R.
Ralph, A. J., Ph.B.
Rommel, E.
Ship, A. P.
Smith, W. A.
Somerville, H. A.
Waterman, C.
Weldon, R. C.
Wigle, C. A.
Wilkinson, W. M.

ORGANIC CHEMISTRY.

Bonelli, J. V., B.A.
Brown, G. T.
Budyk, J. S.
Cameron, A. B.
Chandler, A. B.
Dalton, J. T.
Duggan, R. G.
Ewart, D.
Fairie, J. A.
Gaudet, E. A., B.A.
Greene, H. B.
Hanington, J. W. B.
Henry, .E G., B.A.
Hewitt, T. J.
Keddy, O. B.
King, J. L.
King, S. S.
Lindsay, A. E.
Loggie, W. S.
MacDonald, J. P
MacKay, M. E.
MacLean, J. D.
McDonald, J. C.
McLeod, W. A.
McMicking, A. E. T.
Mabee, O. R., Ph.B.
Paterson, W. J., B.A.
Petersky, S.
Ralph, A. J., Ph.B.
Ritchie, C. A.
Rothwell, O. E.
Rommel, E.
Shaw R. M.
Somerville, H. A.
Sweeney, J. L., B.A.
Walker, J. J., B.A.
Waterman, C.
Wilkinson, W. M.
Weldon, C. R.
Wood, G. O.
Wotherspoon, H. C.

FIRST YEAR.

PRIZES AND HONOURS.

FIRST YEAR PRIZEMAN,

C. S. WILLIAMS, of Tyne Valley, P.E.I.

JUNIOR ANATOMY PRIZE,

P. A. MACDONALD, Alma., N.B.

HONOURS IN AGGREGATE OF ALL SUBJECTS.

1. Williams, C. S.
2. Donnelly, J. H.
3. Crowe, H. S., B.A.
4. MacDonald, P. A.
5. Hunter, A. W.
6. Fraser, D. R.
7. McArthur, R. L.
8. Hillman, O. S.
9. Mair, W. L.
10. Sheahan, J. J.
11. Sims, H. L.
12. Allen, H. C. B.
13. Flegg, R. F.
14. Turnbull, J. W.

PRACTICAL CHEMISTRY—HONOURS.

1. Fraser, R. D.
   Patterson, W. J., B.A.
2. Crowe, H. S., B.A.
   Michaud, N.
5. Williams, C. S.
6. Groves, O. M.
7. Donnelly, J. H.
8. Elliott, M. H.
   McNaughton, G. K.
10. Allen, H. C. B.
    McLeod, J. M.
12. MacDonald, P. A.
    McMillan, J. A.
14. Hillman, O. S.
    Hunter, T. V.
16. Greene, T. B., B.A.
    Hunter, A. W.
    Payne, G. A. L.
    White, J. H.
20. Sheahan, J. J.
21. Malcolm, D. C.
22. Turnbull, J. W.
23. Dearborn, H. F.
    Flegg, R. F.
    Mair, W. L.
26. Kinloch, C. A.
    Wilson, A. A.
28. Clarke, F. C.
    Henderson, S.
30. McNaughton, A.
    Sims, H. L.
32. Hollbrook, R. E.
    Kelly, A. E.
    Wolff, E. K.

BACTERIOLOGY—HONOURS.

1. MacArthur, R. S.
2. Budyk, J. S.
3. Lomer, T. A.
   MacDonald, P. A.
5. Williams, C. S.
6. Hillman, O. S.
7. Sims, H. L.
   Thomson, G. D.
9. Crowe, H. S. B.A.
   Lindsay, E. A.

BIOLOGY—HONOURS.

1. MacDonald, P. A.
2. Crowe, H. S., B.A.
   Williams, C. S.
4. Clarke, F. C.
   Hillman, O. S.
   McMeekin, J. R., M.D.
7. Lindsay, E. A.
8. Turnbull, J. W.
9. MacArthur, R. S.
   Sheahan, J. J.
   Sims, H. L.

PHYSIOLOGY—HONOURS.

1. MacArthur, R. S.
2. Donnelly, J. H.
3. Sims, H. L.
   Williams, C. S.
.5 Weldon, R. C., Jr.
6. Fraser, D. R.
   MacDonald, P. A.
   McDiarmid, J. S.
9. Clarke, F. C.
   Lomer, T. A.
11. Crowe, H. S., B.A.
    Shaw, R. McL., B.A.
13. Christie, H. H.
    Greene, T. B., B.A.
15. Allen, H. C. B.
    Gurd, F. B.
    Hunter, A. W.
    Hunter, T. V.
    Walker, J. J., B.A.

HISTOLOGY—HONOURS.

1. Allen, H. C. B.
   MacDonald, P. A.
   McMillan, J. A.
4. Payne, G. A. L.
5. Lomer, T. A.
   McArthur, C. O.
7. Gurd, F. B.
   Hillman, O. S.
   Weldon, R. C., Jr.
10. Sims, H. S.
11. Hunter, A. W.
    Kerfoot, H. W.
    Lindsay, E. A., B.A.
    Patterson, W. J., B.A.
    Thomson, G. D.
    Williams, C. S.
17. Greene, T. B., B.A.
    Munro, A. R.
    Peat, G. B.
20. Clarke, F. C.
    Hammond, J. F.
    Mair, W. L.
23. MacArthur, R. S.
    Malcolm, D. C.
    Shaw, R. McL., B.A.
26. Baird, W. S.
    Budyk, J. S.
    Hollbrook, R. E.
    Johnson, B. F.
    Kinloch, C. A.
    Mabee, O. R., Ph.B.
    Rothwell, O. E., B.A.
    Sheahan, J. J.
    Wilson, A. A.

PRACTICAL ANATOMY—HONOURS.

1. MacDonald, P. A.
2. Williams, C. S.
3. Allen, H. C. B.
4. Baird, W. S.
   Mair, W. L.
6. Lomer, T. A.
7. Sheahan, J. J.
8. Donnelly, J. H.
   Shaw, R. McL., B.A.
   Rothwell, O. E., B.A.
   Wilson, A. A.
12. Clarke, F. C.
    Gourley, H. B., Ph. B.
    Hunter, A. W.
    Keddy, O. B., B.A.
16. Christie, H. H.
    Hunter, T. V.
    MacArthur, R. S.
19. Gillies, G. E.
    Hollbrook, R. E.
21. Lindsay, E. A., B.A.
    Malcolm, D. C.
    Ralph, A. J., Ph. B.

PHYSICS—HONOURS.

1. Hunter, A. W.
2. Crowe, H. S., B. A.
   Donnelly, J. H.
4. Tilley, A. R.
   Weldon, R. C., Jr.
6. Williams, C. S.
7. Sheahan, J. J.
8. Greene, T. B., B.A.
   Sims, H. L.
   Turnbull, J. W.
11. Walker, J. J., B.A.
12. Fraser, D. R.
    Hillman, O. S.
14. Christie, H. H.
    MacArthur, R. S.
    Wilson, A. A.
17. Flegg, R. F.
    Kelly, A. E.
    Munroe, F. D.
20. Kerfoot, H. W.
    Wolff, E. K.
22. Thomson, G. D.
23. Holden, C. P.
24. Kinloch, C. A.
    Payne, G. A. L.
26. Howlett, G. P.
28. MacDonald, P. A.
    Mair, W. L.
30. McNaughton, G. K.
31. Gillies, G. E.
32. Ryan, E. J.
33. McPhee, J. T.
    White, J. H.
35. Clarke, F. C.
    Hunter, T. V.
    Monahan, R. J.
    Johnson, B. F.

INORGANIC CHEMISTRY—HONOURS.

1. Donnelly, J. H.
2. Fraser, D. R.
3. Flegg, R. F.
4. Shaw, R. McL., B.A.
5. Crowe, H. S., B.A.
   Williams, C. S.
7. Christie, H. H.
8. Hunter, A. W.
9. Mair, W. L.
   Weldon, R. C., Jr.
11. Walker, J. J., B.A.
12. Patterson, W. J., B.A.
13. Tilley, A. R.
14. Keddy, O. B., B.A.
15. Munroe, F. D.
    Turnbull, J. W.
17. Mabee, O. R., Ph.B.
18. Gillies, G. E.
19. Allen, H. C. B.
20. Field, B. R.
21. Hillman, O. S.
    Sheahan, J. J.
23. MacDonald, P. A.

FIRST YEAR PASS LIST.

All Subjects.

The following students, 87 in number, have passed the examination in all the subjects of the First Year, viz.:—Anatomy, Chemistry and Physics, Physiology, Histology, Biology, Practical Chemistry and Bacteriology.

Allen, H. C. B.
Auld, J. W.
Bayley, A. H.
Bonelli, V.
Budyk, J. S.
Chandler, A. B.
Clarke, F. C.
Cole, W. H.
Crowe, H. S., B.A.
Dearborn, H. F.
Donnelly, J. H.
Duggan, R. G.
Field, B. R.
Flegg, R. F.
Fraser, D. R.
Fraser, T. B.
Fripp, G. D.
Gaudet, E. A., B.A.
Gillies, G. E.
Gourley, H. B., Ph.B.
Green, T. B., B.A.
Grimmer, R. D.
Groves, Osler M.
Gurd, F. B.
Gunn, A. K.
Hammond, J. F.
Hewitt, T. J.
Hillman, O. S.
Hollbrook, R. E.
Holden, C. P.
Howlett, G. P.
Hunter, A. W.
Hunter, T. V.
Huycke, A. H.
Johnson, B. F.
Joughins, J. L.
Keddy, O. B.
Kerfoot, H. W.
King, S. S.
Kinloch, C. A.
Lindsay, E. A.
Lomer, T. A.
MacArthur, R. L.
MacDonald, P. A.
McArthur, C. O.
McCormick, A. S.
McDiarmid, J. S.
McDougall, W. L.
McIntosh, G. J.
McLeod, J. M.
McMillan, J. A.
McNaughton, G. K.
McPhee, J. T.
Mackid, L. S.
Mabee, O. R., Ph.B.
Mair, W. L.
Malcolm, D. C.
Michaud, N.
Monahan, R. J.
Muir, W. L., B.A.
Munroe, A. R.
Munroe, F. D.
Parsons, W. H.
Patterson, W. J.
Payne, G. A. L.
Peat, G. B.
Raftery, C. R.
Ralph, A. J., Ph.B.
Rilance, C. D.
Robertson, A. R.
Bothwell, O. E., B.A.
Sawyer, A. R.
Scott, W. J., B.A.
Scott, W. H.
Shaw, R. McL.

Sheahan, J. J.
Sims, H. L.
Somerville, H. A.
Thomson, G. D.
Tierney, J. E.
Tilley, A. R.
Turnbull, J. W.
Walker, J. J., B.A.
Wallace, C. T.
Weldon, R. C.
White, J. H.
Williams, C. S.

FIRST YEAR.

In addition to those whose names appear on the above list, as having passed in all subjects of the First Year, the following have passed in:—

HISTOLOGY.

Baird, W. S.
Burke, G. H.
Clarke, F. C.
Connor, E. L.
Elliot, M. H.
Gray, E. H.
Henderson, E.
Kelly, A. E.
Lyon, G. R. D.
Muir, D. H., Jr.
Ritchie, C. A., B.A.
Shipley, C. E.
Smith, A. B.
Wilson, A. A.
Wolff, E. K.

ANATOMY.

Baird, W. S.
Burke, G. H.
Christie, H. H.
Garcelon, W. S. B. A.
Green, H. B.
Gross, C. J.
Henderson, E.
Hils, H. O.
Kelly, A. E.
Kelsea, W. H.
Lyon, G. R. D.
MacNaughton, A.
McDonald, J. N.
Muir, D. H., Jr.
Ritchie, C. A., B.A.
Wilson, A. A.
Wolff, E. K.

PHYSIOLOGY.

Baird, W. S.
Burke, G. H.
Cameron, A. B.
Christie, H. H.
Elliot, M. H.
Gray, E. H.
Henderson, E.
Kelly, A. E.
Lyon, G. R. D.
McDonald, J. N.
Ritchie, C. A., B.A.
Wilson, A. A.
Wolff, E. K.

PHYSICS.

Baird, W. S.
Burke, G. H.
Cameron, A. B.
Christie, H. H.
Connor, E. L.
Elliot, M. H.
Gabie, W. G.
Gray, E. H.
Gross, C. J.
Henderson, E.
Hils, H. O.
Kelly, A. E.
Kelsea, W. H.
Lahey, J. J.
Lyon, G. R. D.
MacNaughton, A.
McDonald, J. N.
Morrison, J. C.
Muir, D. H., Jr.
Ritchie, C. A., B.A.
Ryan, E. J.
Shipley, C. E.
Smith, A. B.
Wilson, A. A.
Wolff, E. K.

PRACTICAL CHEMISTRY.

Baird, W. S.
Burke, G. H.
Christie. H. H.
Elliot, M. H.
Gray, E. H.
Gross, C. J.
Henderson, E.
Kelly, A. E.
Lahey, J. J.
Lyon, G. R. D.
MacNaughton, A.
McDonald, J. N.
Ritchie, C. A., B.A.
Ryan, E. J.
Shipley, C. E.
Smith, A. B.
Wilson, A. A.
Wolff, E. K.

INORGANIC CHEMISTRY.

Burke, G. H.
Christie, H. H.
Elliot, M. H.
Gray, E. H.
Henderson, E.
Kelly, A. E.
McDonald, J. N.
Wilson, A. A.

BOTANY.

Baird, W. S.
Bonness, E. J.
Burke, G. H.
Christie, H. H.
Elliot, M. H.
Gabie, W. G.
Gray, E. H.
Gross, C. J.
Henderson, E.
Hils, H. O.
Kelly, A. E.
Kelsea, W. H.
Lyon, G. R. D.
MacNaughton. A.
McDonald, J. N.
McMeekin, R. J., M.D.
Muir, D. H., Jr.
Ritchie, C. A., B.A.
Rodrigues, E. T.
Ryan, E. J.
Shipley, C. E.
Smith, A. B.
Wilson, A. A.
Wolff, E. K.
Wright, R. P.

ZOOLOGY.

Baird, W. S.
Bonness, E. J.
Burke, G. H.
Christie, H. H.
Connor, E. L.
Elliot, M. H.
Gabie, W. G.
Gill, F. D.
Gray, E. H.
Gross, C. J.
Henderson, E.
Hils, H. O.
Kelly, A. E.
Lyon, G. R. D.
Muir, D. H., Jr.
MacNaughton, A.
McDonald, N. J.
McGarvey, O.
McMeekin, R. J., M.D
Ritchie, C. A., B.A.
Ryan, E. J.
Wilson, A. A.
Wright, R. P.

BACTERIOLOGY.

Bonness, E. J.
Christie, H. H.
Elliot, M. H.
Garcelon, W. S., B.A.
Gray, E. H.
Gross, C. J.
Hils, H. O.
Lyon, G. R. D.
Muir, D. H., Jr.
Ritchie, C. A., B.A.
Ryan, E. J.
Smith, A. B.
Wallace, C. T.
Wolff, E. K.

INDEX.

I.—MATRICULATION PAPERS.

SEPTEMBER, 1902.

PAGE

Matriculation Examinations.

Algebra, Part I. 7
" " II. 10
Arithmetic 8
Botany. 23
Chemistry. 23
English Composition. 5
" Dictation 3
" Grammar 4
" History. 5
" Literature. 5
French 18
Geometry, Part I. 9
" " II 9
German. 20
Greek Authors. 11
" Grammar and Composition 14
" Translation at Sight. 14
Latin Authors 15
" Grammar. 17
" Prose Composition. 17
" Translation at Sight 16
Physics. 24
Physiography. 22
Trigonometry 10

II.—EXHIBITION AND SCHOLARSHIP PAPERS.

FACULTY OF ARTS.

SEPTEMBER, 1902.

Exhibitions—First Year.

Algebra, Part I. 43
" II. 45
English Composition. 48

PAGE

English Grammar.. 46
English Literature (Macaulay) 47
" " (Milton) 47
" " (Morley).. 48
French.. 48
Geometry, Part I 42
" " 44
German.. 50
Greek Authors 36
" Comp. and Trans. at Sight (alternative) 42
" Grammar, Comp., Higher Comp. and Sight Translation.. 40
" Translation at Sight.. 40
Latin Authors.. 29
" Grammar.. 32
" Prose Composition 32
" Translation at Sight.. 31
" " " (alternative) 34
" " " and Comp. (additional) .. 33
Trigonometry.. 45

Exhibitions—Second Year..

Algebra 66
" (Theory of Equations) 68
English Language (Trench) 69
" Literature and Composition.. 69
French.. 70
Geometry.. .. ..65, 66
German.. 71
Greek Authors.. 57
" Composition.. 60
" Grammar.. 60
" History.. 60
" Translation at Sight.. 59
History (Church).. 70
" Roman.. 63
Latin Authors.. 61
" Comp. and Grammar.. 63
" Translation at Sight.. 62
Roman History.. 63
Theory of Equations.. 68
Trigonometry.. 66

PAGE

Scholarships—Third Year.

Algebra, Higher 81
" (Theory of Equations) 81
Calculus 80
Chemistry 83, 84
Constitution and Govt. of England 99
English Composition 93
" Literature (Lamb) 93
" " (Milton) 93
" " (Shakespeare) 92
French 94
Geometry, Analytic 77, 78
German 95
Greek Authors 84
" Composition 87
" History 91
" Translation at Sight 87
Higher Algebra 81
History (Myers) 94
" Greek 91
" Roman 92
Latin Authors 88
" Composition 90
" Translation at Sight 90
Logic 82
Political Economy 99, 100
Political Science, Elements of 99
Roman History 92
Theory of Equations 81
Trigonometry 81

III.—EXHIBITION AND PRIZE EXAMINATIONS.

FACULTY OF APPLIED SCIENCE.

SEPTEMBER, 1902.

Exhibition and Prize Examinations.

Descriptive Geometry 107
English, Summer Readings in 106
Mathematics, Second Year 103
" Third and Fourth Years 105
Theory of Structures 108

IV.—SESSIONAL EXAMINATION PAPERS.

FACULTY OF ARTS.

APRIL, 1903.

PAGE

Algebra.—See Mathematics and Natural Philosophy.

Anglo-Saxon.—See English Honours.
Arithmetic.—See Mathematics and Natural Philosophy.

Art History and Archaeology.
Art History and Classical Archæology.. 231

Biology.
Continuation Biology 331, 332
Elementary Plant Biology.. 330
" Animal Biology.. 329
" Animal Biology (Supplemental) .. 332

Botany.
Botany, Third Year 334
" Fourth Year.. 335
" (Plant Physiology), Fourth Year....337, 338
" (Systematic), Fourth Year.. 336
Calculus.—See Mathematics and Natural Philosophy.

Chemistry.
Chemistry, Second Year.. 326
Organic Chemistry, Third Year.. .. ..326, 327

Classical Literature and History.
Comparative Philology.. 191
Greek Authors, First Year.. 113
" " Second Year.. 117
" " Second Year (Adv. Section).. .. 129
" " Third and Fourth Years 123
" Composition, First Year.. 116
" " Second Year.. 121
" " Third and Fourth Years.. .. 126
" History, First Year.. 117
" " and Literature, Second Year.. .. 122
" " Third and Fourth Years.. 127

PAGE

Greek Translation at Sight, First Year.. 116
" " " Second Year.. 121
" " " Third and Fourth Years.. 126
Latin Authors, First Year 151
" " Second Year 157
" " Third Year 162
" " Third and Fourth Years 165
" Prose and Unseen, First Year.. 155
" " " Second Year 160
" " " Third and Fourth Years 166
Roman History, First Year.. 156
" " and Quintilian, Second Year.... 161
" " Third and Fourth Years.. 167

Classical Honours.

Greek, Pindar.. 134
" Plato, Forman's Selections 138
" Private Readings (Sophocles, etc.).. 131
" " " (Prose).. 145
" " " (Aristophanes, etc.). .. 149
" Prose Composition 144
" Third and Fourth Years 140
" Translation at Sight.. 142
Latin, Cicero's Verrine Orations 176
" Plautus and Terence.. 179
" Private Readings.. 185
" Private Readings, Plautus, etc 188
" " " Virgil, etc.. 170
" Prose Composition 174
" Special Paper.. 168
" Translation at Sight.. 172
" Virgil, Lucan.. 182
Comparative Philology.—See Classical Literature.
Dynamics.—See Mathematics and Natural Philosophy.

Economics and Political Science.

Economic History of England, Third and Fourth Years 229, 230
Political Economy.. 227
Political Science 228
" " (Honours).. 229

PAGE

English Language and Literature.

Elizabethan Drama, Third Year 200
English Composition, Second Year 196
" " (Affiliated Coll.), Sec. Year 198
" " Third Year.. 199
" " Fourth Year 203
" Language and Composition, First Year.. 194
" Literature, First Year.. 193
" " Second Year.. 196
" " (Affiliated Colleges, Second Year.. .. ..197, 198
" " Third Year.. 198
" " Third and Fourth Years.. .. 200
" (History of Fiction), Fourth Year 202
" Literature, Fourth Year 200, 201
History of Fiction, Fourth Year.. 202

English Honours.

Anglo-Saxon, Third Year 208, 209, 211
Browning, Fourth Year.. 215
Chaucer, Third Year.. 204
History of Literature.. 214
History of Shaksperean Criticism.. 215
Middle English.. 212
Modern Prose 216, 217
Prose Writers before Dryden, Third Year....206, 208
Spenser and Milton.. 205

Experimental Physics.—See Mathematics and Natural Philosophy.
French.—See Modern Languages.
French Honours.—See Modern Language Honours.

Geology.

Geology, Third and Fourth Years.. 343

Geology Honours.

Determinative Mineralogy, Third Year.. 344
Geology and Mineralogy, Third Year.. 345
Geometry.—See Mathematics and Natural Philosophy.
German.—See Modern Languages.
German Honours.—See Modern Language Honours.
Greek.—See Classical Literature and History.
Greek History.—See Classical Literature and History.

PAGE

Greek Honours.—See Classical Honours.
Hebrew.—See Semitic Languages.

History.

English Constitutional History, Third and Fourth Years.. 219
History, First Year.. 193
" Third and Fourth Years 218

History Honours.

Arnold, Parkman, Mahan, Fourth Year.. 224
Bagehot, Bryce, Fourth Year.. 224
Clarendon, Macaulay, Burke Fourth Year.. 226
Gibbon, Stubbs, Langlois, Fourth Year.. 225
Greek Authors, Third Year.. 220
History Honours, Third and Fourth Years 222
Political History of the American Colonies 223
" " of the United States.. 223
Polybius, Livy, Tacitus, Third Year.. 221
Latin.—See Classical Literature and History.
Latin Honours.—See Classical Honours.
Logic.—See Mental and Moral Philosophy.

Mathematics and Natural Philosophy.

Algebra (Advanced Section), First Year 300
Analytic Geometry (Advanced Section), Second Year.. .. ..302, 303
Astronomy and Optics, Third and Fourth Years. 295
Calculus (Advanced Section), Second Year 304
Experimental Physics (Sound, Heat and Light), Third Year.. 322
Experimental Physics (Electricity and Magnetism), Third and Fourth Years 323
Geometry and Arithmetic, First Year 289
Geometry (Advanced Section), First Year ..298, 299
Mechanics and Hydrostatics, Third and Fourth Years.. 296
Physics, First Year 320
Plane and Spherical Trigonometry (Advanced Section).. 306
Solid Geometry, Conic Sections, Dynamics, Second Year.. 294

PAGE

Spherical Trigonometry and Algebra, Second Year.. 292
Theory of Equations (Advanced Section), First Year.. 300
Trigonometry and Algebra First Year 290

Mathematics and Natural Philosophy Hon-
Astronomy, Third and Fourth Years 313
Calculus and Theory of Plane Curves 317
Differential Equations, Third and Fourth Years.. 313
Dynamics, Third Year 309
Lunar Theory.. 316
Optics, Third Year.. 307
Quaternions.. 315
Statics, Third Year.. 311
Surfaces, Fourth Year.. 319

Mental and Moral Philosophy.
History of Modern Philosophy 274
Logic, Second Year.. 270
Logic and Psychology (Advanced Section), Second Year 275, 276
Mental Philosophy, Third and Fourth Years.. .. 273
Moral Philosophy, Third and Fourth Years 272
Psychology, Second Year.. 270

Mental and Moral Philosophy Honours..
Epistemology (General).. 279
" (Historical).. 278
Greek Philosophy, Third Year.. 282
Locke, Berkeley, Hume, Third Year 280, 281
Philosophy of Kant, Fourth Year.. 282
Plato and Aristotle.. 277
Principles and Methods of Ethics, Fourth Year.. .. .. 283 285
Schopenhauer, Fourth Year.. 286
Spinoza's Ethics, Fourth Year.. 288
Watson's Outline of Philosophy, Fourth Year.... 287

Modern Languages.
French, First Year 233, 235
French, Second Year.. .. .. 236, 237
" Third and Fourth Years.. 239

PAGE

German, Beginners 241, 243
" First Year 245, 248
" Second Year.. .. ..250, 252
" Third and Fourth Years 254, 257
Italian, Third and Fourth Years.. 233

Modern Language Honours.

French, Le Drame.. 240
" Littérature 241
German 258
" Philology.. 259
Optics.—See Mathematics and Natural Philosophy Honours.
Physics.—See Mathematics and Natural Philosophy.
Physiography. See Geology Honours.
Psychology.—See Mental and Moral Philosophy.
Roman History.—See Classical Literature and History.

Semitic Languages.

Hebrew, Second Year.. 263
" Third and Fourth Years.. 265
" (Neil Stewart Prize).. .. ..267, 268
Statics.—See Mathematics and Natural Philosophy Honours.
Trigonometry.—See Mathematics and Natural Philosophy.

Zoology.

Advanced Zoology, Fourth Year.. .. ..341, 342
Zoology, Third and Fourth Years.. 340

Zoology Honours.

Spencer's Principles of Biology.. 342

V.—SESSIONAL EXAMINATIONS.

FACULTY OF APPLIED SCIENCE.

APRIL, 1903.

Architecture.

Elements of Architecture, Second Year.. 349
History of Architecture, Second Year 349

PAGE

Chemistry and Assaying.

Analytic Chemistry, Third Year.. 356
" " Fourth Year 357
Assaying, Third Year.. 351
Chemistry, Second Year.. 351
Electro-Chemistry, Fourth Year.. 359
Gas Analysis, Fourth Year.. 360
Industrial Chemistry, Third Year 355
Mineral Analysis, Fourth Year.. 358
Organic Chemistry, Third Year 353
Physical Chemistry, Fourth Year.. 359
Qualitative Analysis, Third Year.. 354

Civil Engineering and Applied Mechanics.

Graphical Statics, Third Year.. 362
Hydraulics, Fourth Year.. .. .. 372, 374
Hydraulic Machinery, Fourth Year.. 377
" Laboratory, Fourth Year 378
Municipal Engineering, Third and Fourth Years 366
Structural Engineering, Third and Fourth Years 367
Testing Laboratory, Third Year 363
Theory of Structures, Third and Fourth Years.. 369
" " Fourth Year 381, 383
" " Third Year 388

Descriptive Geometry.

Descriptive Geometry, First Year.. 386
" " Second Year.. 387
" " Third Year.. 388

Electrical Engineering.

Alternating Currents, Fourth Year.. 395
Alternating Current Machinery, Fourth Year.... 395
Continuous Current Machinery, Third Year 391
Electric Lighting, Fourth Year 397
Electrical Measurements, Third Year 392
Electric Traction, Fourth Year 398
Electro-Magnetism, Third Year 393
Physical Laboratory, Second Year 390

English.

English Composition First Year.. 400

PAGE

Geology and Mineralogy.

Canadian Geology, Fourth Year 402
Geology, Third Year 401
Petrography, Fourth Year.. 404
Physiography, Fourth Year.. 403
Practical Geology and Ore Deposits, Fourth Year 405

Mathematics.

Mathematics, First Year 406, 407, 409, 410
" Second Year.. .. ..412, 413, 414
" Third Year.. .. ..416, 417

Mechanical Engineering.

Designing, Fourth Year.. 426
Dynamics of Machinery, Third Year 420
" " Fourth Year.. 427
Kinematics of Machines, Second Year 419
Machine Design, Third Year 422
" " Fourth Year.. .. ..428, 430
Mechanical Drawing, Second Year 420
" " Third Year.. 423
Mechanical Engineering, Fourth Year.. .. .. ..432, 433
" " Laboratory Work 435
Thermodynamics, Third Year.. 424
" Fourth Year 437

Metallurgy.

Advanced Metallurgy, Fourth Year.. 441
Electro-Metallurgy, Fourth Year.. 440
Gold, Silver and Lead, Fourth Year.. 441

Mineralogy.

Mineralogy, Third Year.. 443

Mining Engineering.

Milling and Ore Dressing, Fourth Year.. 446
Mining, Third Year 444
" Fourth Year 447
Mining and Metallurgical Machinery, Fourth Year.. 449
Ore Dressing, Third Year 445

PAGE

Physics (Experimental).

Electricity and Magnetism Second Year 454
Physical Laboratory, Second Year 390
Sound, Light and Heat First Year.. 453

Surveying Geodesy and Transportation.

Geodesy, Fourth Year 460
Practical Astronomy, Third Year.. 457
Railway Engineering, Third and Fourth Years.. 459
Surveying, Second Year.. 456
Transportation, Third Year 458

VI.—SESSIONAL EXAMINATIONS.

FACULTY OF LAW.

APRIL, 1903.

Civil Procedure, First Year 465
Civil Procedure, Second Year 470
" " and Evidence, Third Year 480
Commercial Law, Second and Third Years 476
" " Third Year,. 481
Constitutional Law, First Year.. 466
Constitutional Law and Obligations, Third Year .482
Criminal Law, Second and Third Years.. 477
Gifts and Successions, Second and Third Years.. 478
History of Law of Lower Canada, First Year.. .. 466
History, Agency and Corporations, Third Year.. 483
International Law, Third Year.. 484
Law of Corporations, Second Year 471
Law of Obligations, First Year.. 467
Law of Persons, First Year.. 468
Marriage Covenants, etc.. Third Year 485
Prescription, Lease—Municipal, Second Year.. .. 473
Public International Law, Second Year.. 472
Real Property Law, First Year 469
" " Second Year 474
" " Third Year.. 487
Roman Law, First Year.. 470
" " Third Year.. 488

VII.—MATRICULATION AND A.A. EXAMINATIONS.

JUNE, 1903.

PAGE

Preliminary Subjects.

Arithmetic .. 494
English Composition .. 491
" Dictation .. 491
" Grammar .. 492
" History .. 493

Optional Subjects.

Algebra, Part I .. 507
" Part II .. 508
Botany .. 519
Chemistry .. 518
Drawing .. 519
English Language .. 510
" Literature .. 511
French .. 503
Geometry, Part I .. 508
" Part II .. 508
German .. 505
Great Events of History .. 514
Greek .. 499, 502
Greek and Roman History .. 515
Latin .. 496, 498
Physics .. 516
Physiography .. 515
Trigonometry .. 509

VIII.—FIRST YEAR EXHIBITIONS.

FACULTY OF ARTS.

JUNE, 1903.

B. Exhibitions.

Algebra .. 534
English .. 523
French .. 529
Geometry .. 534
German .. 530

PAGE
Greek.. .. ..525, 528
Latin 523
Trigonometry.. 535

C. Exhibitions.

English History.. 536
" Language and Composition.. 538
" Literature.. 536
French.. 546
German.. 548
Latin.. .. ..540, 542, 544

IX.—MATRICULATION, SECOND YEAR EXHIBITION AND SCHOLARSHIP EXAMINATIONS.

SEPTEMBER, 1903.

Matriculation Examinations.

Arithmetic.. 553
Algebra, Part I.. 569
" Part II.. 571
Botany.. 573
Chemistry.. 573
English Composition.. 551
" Dictation.. 551
" Grammar.. 552
" History.. 553
" Literature.. 554
French.. 565
Geometry, Part I 570
" Part II.. 571
German.. 567
Greek.. .. ..557, 558
Latin.. .. ..561, 562
Physics.. 574
Physiography.. 572
Trigonometry 572

Second Year Exhibitions.

Algebra 589, 590
English (Trench) 591

PAGE

English Literature and Composition.. 592
French.. 594
Geometry 588, 589
German.. 595
Greek Authors.. 579
" Comp., Grammar and History.. 586
" Translation at Sight 582
History (Church).. 593
" Roman.. 587
" Greek.. 583
Latin Authors, and Unseen.. 584
" Comp. Grammar and History.. 586
Roman History.. 587
Theory of Equations.. 590
Trigonometry.. 590

Third Year Scholarships.

Algebra.. 604
Analytic Geometry 601, 602
Biology (Plant).. 607
" (Animal).. .. ..608, 609
Calculus.. 603
Constitution and Government of England.. 624
Elements of Economic Theory 624, 625
Elements of Political Science 624
English Composition.. 620
" Literature (Lamb).. 620
" " (Milton) 619
" Shakspere.. 619
French.. 621
Geometry, Analytic 601, 602
German.. 622
Greek Authors 610
" Composition.. 613
" History 618
" Translation at Sight.. 613
History of Economic Theory 626
History (Meyer's).. 620
History (Myers).. 620
Greek 618
Latin Authors.. 615
" Composition.. 617
" Translation at Sight.. 617

PAGE
Logic 606
Roman History.. 618
Theory of Equations.. 604
Trigonometry 604

X.—EXHIBITION AND PRIZE EXAMINATIONS

FACULTY OF APPLIED SCIENCE.

SEPTEMBER, 1903.

Exhibition and Prize Examinations.

Descriptive Geometry.. 632
English, Summer Readings.. 631
Mathematics.. .. ..629, 630
Theory of Structures.. 633

MATRICULATION EXAMINATIONS.

SEPTEMBER, 1902.

FACULTIES OF ARTS, APPLIED SCIENCE AND MEDICINE.

Papers are arranged in the order of subjects as stated in the Calendar.

MATRICULATION EXAMINATIONS.

ENGLISH DICTATION.

FRIDAY, SEPTEMBER 12TH:—AFTERNOON, 2 TO 2.30.

Pass by the other parts and look at the manner in which the people of New England have of late carried on the whale fishery. Whilst we follow them among the trembling mountains of ice, and behold them penetrating into the deepest frozen recesses of Hudson's Bay of Davis's Straits, whilst we are looking for them beneath the arctic circle, we hear that they have pierced into the opposite region of polar cold, that they are at the antipodes, and engaged under the frozen serpent of the South. Falkland Island, which seemed too remote and romantic an object for the grasp of national ambition, is but a stage and resting-place in the progress of their victorious industry. Nor is the equinoctial heat more discouraging to them than the accumulated winter of both the poles. We know that whilst some of them draw the line and strike the harpoon on the coast of Africa, others run the longitude and pursue their gigantic game along the coast of Brazil. No sea but what is vexed by their fisheries. No climate that is not witness to their toils. Neither the perseverance of Holland, nor the activity of France, nor the dexterous and firm sagacity of English enterprise, ever carried this most perilous mode of hard industry to the extent to which it has been pushed by this recent people; a people who are still, as it were, but in the gristle, and not yet hardened into the bone of manhood.

[Note for the Presiding Examiner.—The Presiding Examiner will read the extract *three* times, the candidates writing it out during the *second* reading. The first and third readings are respectively intended to give the candidates a general idea of the character of the pas-

sage, and to guide them in punctuating. *As it is of great importance that candidates should not be left in a state of uncertainty, the Deputy Examiner will repeat, on request, any word or phrase. He will also inform the candidates that obvious attempts to make letters do double duty (e.g., to make a letter serve for e or i) will be regarded as mistakes. Full stops and semi-colons are to be indicated by the Presiding Examiner.*]

ENGLISH GRAMMAR.

FRIDAY, SEPTEMBER 12TH:—MORNING, 9 TO 10.30.

(*Questions 1 and 2 are obligatory*).

1. Parse: I told him who had seen the meat that the dog stole.

2. Analyse the sentence given in question 1.

3. Write the abstract nouns which correspond to the following adjectives: *red, distant, near, able, merry.* Compare these adjectives and give rules applying to them.

4. Write the possessive plural of *deer, man servant, church, potato, German.* Write (*a*) a complex sentence in which the possessive plural of *deer* forms part of a noun clause; (*b*) a complex sentence in which the possessive plural of *potato* forms part of an adjective clause; (*c*) a complex sentence in which the possessive plural of *German* forms part of an adverbial clause.

5. (*a*) Illustrate the following terms: cognate objective, complement of the predicate, objective genitive, apposition, gerundial infinitive.

(*b*) Write in the passive form: I read the book. They occupied the hill that the soldiers were climbing. Occupy the town.

6. Give two examples of each of the following: distributive pronoun; the second person singular of the past indefinite tense (indicative mood) of a weak verb; indefinite pronoun; irregular comparison of adverbs; feminine suffix of foreign origin; prefix of Teutonic (English) origin.

ENGLISH HISTORY.

FRIDAY, SEPT. 12TH:—MORNING, 10.30 TO 12.30.

Answer the last two questions and any four of the others.

1. Describe the conquest of Britain by the Angles, Saxons and Jutes, and give some account of their settlement.

2. Sketch the reign of Henry III.

3. Outline the relations of England and France during the fifteenth century.

4. What are the main landmarks of the Reformation in England?

5. Sketch the character and career of Oliver Cromwell.

6. (*a*) What were the leading events of the Seven Years' War?

(*b*). State the chief results of that contest.

7. Make brief notes on the following subjects: The New Forest; the Foreign Possessions of Henry II.; the Black Death; the Execution of Sir Walter Raleigh; the Dutch in the Medway; the Fall of Walpole; the Battle of St. Vincent; the Irish Rebellion of 1798; the Walcheren Expedition; the Abolition of Slavery.

8. Assign events to the following dates: 1154; 1264; 1346; 1485; 1640; 1688; 1704; 1775; 1812; 1832.

ENGLISH COMPOSITION.

FRIDAY, SEPTEMBER 12TH:—AFTERNOON, 4.30 TO 5.30.

Write an essay of not less than two pages on any *one* of the following subjects:—

(*a*) A Deed of Daring.
(*b*) A Summer Holiday.
(*c*) A Recent Invention.

ENGLISH LITERATURE.

FRIDAY, SEPTEMBER 12TH:—AFTERNOON, 2.30 TO 4.30.

Candidates will answer groups A or B and C. Ontario candidates may substitute D for either A or B or C.

The answers to each section must be written in separate books.

A.—SELECTIONS FROM TENNYSON, PART I.

1. Write on the characteristics of Tennyson the poet,

illustrating each point by definite reference to some poem or poems.

2. Quote any twelve consecutive lines of one of the poems studied, and add a short criticism on the same, *or* outline the story of *The Revenge*, and comment upon it.

3. Give the context of each of the following, and name the poem in which it is found:—

(*a*) The black earth yawns: the mortal disappears.

(*b*) Life, anguish, death, immortal love, ceasing not, mingled, unrepress'd.

(*c*) And a wave like the wave that is raised by an earthquake grew.

(*d*) Lo! ever thus thou growest beautiful
In silence.

(*e*) The gods are hard to reconcile.

(*f*) Some work of noble note, may yet be done.

(*g*) May God forgive me!—I have been to blame.

B.—THE LADY OF THE LAKE.

1. Give, from this poem, examples of Scott's accuracy in observing natural phenomena of the following characters:—

(*a*) Colour.

(*b*) Animals and their habits.

(*c*) Mountain scenery.

2. Write an outline account of The Chase, *or* The Combat (Canto I., *or* Canto V.).

3. Explain:—shallop, snood, scaur, Taghairm, upon her eyry nods the erne, let each the *buxom* chorus bear, and merry *morrice-dancers* come, a stag of ten.

4. Make notes on the metre used by Scott in this poem for descriptive and narrative purposes. Quote and scan eight consecutive and characteristic verses.

C.—SHAKESPEARE—RICHARD II.

1. Quote from the play five instances of the use of similes or metaphors, and five of playing upon words.

2. What appears to you the most striking defect of Richard's character? Illustrate by references or quotations.

3. Explain the following passages, and state by whom, to whom, and on what occasion they are spoken:—

(*a*) My lord, wise men ne'er sit and wail their woes
But presently prevent the ways to wail.
(*b*) And daily new exactions are devised,
As blanks, benevolences and I wot not what.
(*c*) Thou, old Adam's likeness, set to dress this garden,
How dares thy harsh rude tongue sound this unpleasing news ?
(*d*) The hopeless word of "never to return"
Breathe I against thee, upon pain of life.

D.—SCOTT: LAY OF THE LAST MINSTREL.

1. Write on the characteristics of Scott as a poet, dwelling particularly on those shown in The Lay of the Last Minstrel.

2. Quote any twelve lines of the poem which seem to you particularly striking, and comment on the same.

3. Make notes on the following:—Gramarye, Geraldine, grim Odin, Runic column, slogan, heriot, Michael Scott, lyke-wake, drie, the art that none may name.

4. Write a short criticism on the songs which are introduced into the poem, and show how they bear on its main theme.

5. Discuss the supernatural element in the poem.

ALGEBRA AND ARITHMETIC.

THURSDAY, SEPTEMBER 11TH:—AFTERNOON, 2 TO 5.

A.—ALGEBRA.

1. Reduce to its lowest terms

$$\frac{x^3 - 3a^2x + 2a^3}{2x^3 + ax^2 + a^2x - 4a^3}$$

2. Solve the following equations:

(*a*) $\frac{x-4}{x-5} - \frac{x-5}{x-6} = \frac{x-7}{x-8} - \frac{x-8}{x-9}$

(*b*) $\sqrt{x+14} + \sqrt{x-14} = 14$

(c) $\frac{x+y}{3}+x=15, \quad \frac{x-y}{5}+y=6$

3. If the numerator of a certain fraction be increased by one, and the denominator be diminished by one, the value will be one; if the numerator be increased by the denominator, and the denominator diminished by the numerator, the value will be four: find the fraction.

4. Solve the following:

(a) $\frac{2x}{x+2}+\frac{x+2}{2x}=2.$

(b) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1, \quad \frac{x}{a}+\frac{y}{b}=1$

5. Simplify

$$2\sqrt[3]{4}+5\sqrt[3]{32}-\sqrt[3]{108}.$$

Rationalize the denominator of

$$\frac{2\sqrt{3}+3\sqrt{2}}{3\sqrt{3}-2\sqrt{5}}$$

Find the value of

$$\sqrt[3]{3}\times\sqrt[4]{4}\times\sqrt[6]{648}$$

B.—ARITHMETIC.

6. A lake whose area is 45 acres is covered with ice 3 in. thick. Find the weight of the ice in tons if a cubic foot of ice weigh 920 oz.

7. In how many years will $320 double itself at 7½ per cent. simple interest.

8. A watch set accurately at 12 o'clock indicates 10 minutes to 5 at 5 o'clock. What is the exact time when the watch indicates 5 o'clock?

GEOMETRY.

THURSDAY, SEPTEMBER 11TH:—MORNING, 9 TO 12.

1. Any two sides of a triangle are together greater than the third side.

(*a*) The difference of any two sides of a triangle is less than the third side.

2. The complements of the parallelograms about the diagonal of any parallelogram are equal to one another.

3. Bisect a triangle by a straight line drawn from a given point in one of its sides.

4. Describe a square equal to a given rectilineal figure.

5. The sum of the squares on the sides of a parallelogram is equal to the sum of the squares on the diagonals.

6. If a straight line be divided into any two parts, the sum of the squares on the whole line and on one of the parts is equal to twice the rectangle contained by the whole line and that part together with the square on the other part.

7. Draw a tangent to a circle from a given point without the circle.

(*a*) Shew that two such tangents may be drawn from the same point.

8. If a straight line touch a circle and from the point of contact a chord be drawn, the angles which this chord makes with the tangent shall be equal to the angles in the alternate segments.

9. Describe a circle which shall pass through three given points not in the same straight line.

MATHEMATICS, PART II.

TUESDAY, SEPT. 16TH:—MORNING, 9 TO 12.30.

GEOMETRY.

1. (1) Describe an isosceles triangle having each of the base angles double of the vertical angle.

(2) What are the relations connecting the vertical angle and the equal base angles in the other isosceles triangles of the figure?

(3) If the two circles of the figure intersect in D and E, and A is the centre of the larger one, show that ADE is another isosceles triangle having each of the base angles double of the vertical angle.

2. (1) If, of three straight lines, the rectangle contained by the extremes be equal to the square on the mean, the three straight lines will be proportionals.

(2) Show that the base of one of the isosceles triangles in the figure of question 1 is a mean proportional between those of the other two.

3. Parallelograms which are equiangular to one another, have to one another the ratio which is compounded of the ratios of their sides.

ALGEBRA.

4. If $\frac{p}{\sqrt{b-c}} = \frac{q}{\sqrt{c-a}} = \frac{r}{\sqrt{a-b}}$, show that $p^2 + q^2 + r^2 = 0$.

5. How many numbers of four figures, in each of which the figures are all different, contain 0?

How many do not contain 0?

6. Insert three geometric means, two arithmetic means, and one harmonic mean, between 2 and 18.

7. Expand $(1 + 2x)^{-\frac{1}{2}}$ to four terms by the Binomial Theorem.

8. (1) Prove that the sum of the logarithms of two numbers is equal to the logarithm of their product.

(2). Find the value of $\log \sqrt{2} + \frac{1}{2} \log (x-3) - \log (x-9)^2$ when $x = 8$.

9. The circular (radian) measure of an angle at the centre of a circle is equal to the ratio of the subtending arc to the radius.

10. Express sin A, cos A, etc., in terms of cosec A.

11. Given tan $A = 1$, what is the least positive value of A? What is the second least positive value of A? Answer the same questions, gven sec $A = \sqrt{2}$

12. Express the ratios of $90°-A$, and those of $270°-A$ in terms of those of A.

13. Prove that

(1) $\cot^2 A - \cos^2 A = \cos^4 A \operatorname{cosec}^2 A$,

(2) $\sin^2 A + \cos^4 A = \cos^2 A + \sin^4 A$,

(3) $\sin (A + B) = \sin A \cos B + \cos A \sin B$.

(4) $\cos A + \cos B = 2 \cos \frac{1}{2}(A + B) \cos \frac{1}{2}(A - B)$,

(5) $\dfrac{1 + \sin A}{1 + \cos A} = \frac{1}{2}(1 + \tan \frac{1}{2} A)^2$.

14. Solve the equation

$$8 \sin^4\theta - 6 \sin^2\theta + 1 = 0$$

for positive values of θ less than 360°.

GREEK AUTHORS.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 10 TO 12.

(*Candidates should write either on A or on B.*)

A. XENOPHON, ANABASIS I.

Translate, parsing in full, and explaining constructions of words underlined:—

(1) ὁ δὲ Κῦρος δίδωσιν αὐτῷ εἰς τετρακισχιλίους καὶ ἓξ μηνῶν μισθόν, καὶ δεῖται αὐτοῦ μὴ πρόσθεν καταλῦσαι πρὸς τοὺς ἀντιστασιώτας πρὶν ἂν αὐτῷ συμβουλεύσηται. οὕτω δὲ αὖ τὸ ἐν Θετταλίᾳ ἐλάνθανεν αὐτῷ τρεφόμενον στράτευμα. Πρόξενον δὲ τὸν Βοιώτιον ξένον ὄντα ἐκέλευσε λαβόντα ἄνδρας ὅτι πλείστους παραγενέσθαι, ὡς εἰς Πισίδας βουλόμενος στρατεύεσθαι, ὡς πράγματα παρεχόντων τῶν Πισιδῶν τῇ ἑαυτοῦ χώρᾳ.

(2) Κῦρος δὲ ἐπεὶ εἰσήλασεν εἰς τὴν πόλιν, μετεπέμπετο τὸν Συέννεσιν πρὸς ἑαυτόν· ὁ δ' οὔτε πρότερον οὐδενί πω κρείττονι ἑαυτοῦ εἰς χεῖρας ἐλθεῖν ἔφη οὔτε τότε Κύρῳ ἰέναι ἤθελε, πρὶν ἡ γυνὴ αὐτὸν ἔπεισε καὶ πίστεις ἔλαβε. μετὰ δὲ ταῦτα ἐπεὶ συνεγένοντο ἀλλήλοις, Συέννεσις μὲν ἔδωκε Κύρῳ χρήματα πολλὰ εἰς τὴν στρατιάν, Κῦρος δὲ ἐκείνῳ δῶρα ἃ νομίζεται παρὰ βασιλεῖ τίμια, ἵππον χρυσοχάλινον καὶ στρεπτὸν χρυσοῦν καὶ ψέλια καὶ ἀκινάκην χρυσοῦν καὶ στολὴν Περσικήν, καὶ τὴν χώραν μηκέτι διαρπάζεσθαι· τὰ δὲ ἡρπασμένα ἀνδράποδα, ἤν που ἐντυγχάνωσιν, ἀπολαμβάνειν.

(3) ἀλλ' ἐγώ φημι ταῦτα μὲν φλυαρίας εἶναι· δοκεῖ δέ μοι ἄνδρας ἐλθόντας πρὸς Κῦρον οἵτινες ἐπιτήδειοι σὺν Κλεάρχῳ ἑρωτᾶν ἐκεῖνον τί βούλεται ἡμῖν χρῆσθαι· καὶ ἐὰν μὲν ἡ πρᾶξις ᾖ παραπλησία οἵαπερ καὶ πρόσθεν ἐχρῆτο τοῖς ξένοις, ἕπεσθαι καὶ ἡμᾶς καὶ μὴ κακίους εἶναι τῶν πρόσθεν τούτῳ συναναβάντων· ἐὰν δὲ μείζων ἡ πρᾶξις τῆς πρόσθεν φαίνηται καὶ ἐπιπονωτέρα καὶ ἐπικινδυνοτέρα, ἀξιοῦν ἢ πείσαντα ἡμᾶς ἄγειν ἢ πεισθέντα πρὸς φιλίαν ἀφιέναι· οὕτω γὰρ καὶ ἑπόμενοι ἂν φίλοι αὐτῷ καὶ πρόθυμοι ἑποίμεθα καὶ ἀπιόντες ἀσφαλῶς ἂν ἀπίοιμεν· ὅ,τι δ' ἂν πρὸς ταῦτα λέγῃ ἀπαγγεῖλαι δεῦρο· ἡμᾶς δ' ἀκούσαντας πρὸς ταῦτα βουλεύεσθαι.

(4) ἐκ ταύτης οἱ στρατιῶται ἠγόραζον τὰ ἐπιτήδεια, σχεδίαις διαβαίνοντες ὧδε. διφθέρας ἃς εἶχον στεγάσματα ἐπίμπλασαν χόρτου κούφου, εἶτα συνῆγον καὶ συνέσπων, ὡς μὴ ἅπτεσθαι τῆς κάρφης τὸ ὕδωρ· ἐπὶ τούτων διέβαινον καὶ ἐλάμβανον τὰ ἐπιτήδεια, οἶνόν τε ἐκ τῆς βαλάνου πεποιημένον τῆς ἀπὸ τοῦ φοίνικος καὶ σῖτον μελίνης· τοῦτο γὰρ ἦν ἐν τῇ χώρᾳ πλεῖστον.

(5) οὗτος Κύρῳ εἶπεν, εἰ αὐτῷ δοίη ἱππέας χιλίους, ὅτι τοὺς προκατακάοντας ἱππέας ἢ κατακάνοι ἂν ἐνεδρεύσας ἢ ζῶντας πολλοὺς αὐτῶν ἂν ἕλοι καὶ κωλύσειε τοῦ κάειν ἐπιόντας, καὶ ποιήσειεν ὥστε μήποτε δύνασθαι αὐτοὺς ἰδόντας τὸ Κύρου στράτευμα βασιλεῖ διαγγεῖλαι.

(6) πάντες δ' οὗτοι κατὰ ἔθνη ἐν πλαισίῳ πλήρει ἀνδρῶπων ἕκαστον τὸ ἔθνος ἐπορεύετο. πρὸ δὲ αὐτῶν ἅρματα διαλείποντα συχνὸν ἀπ' ἀλλήλων τὰ δὴ δρεπανηφόρα καλούμενα· εἶχον δὲ τὰ δρέπανα ἐκ τῶν ἀξόνων εἰς πλάγιον ἀποτεταμένα καὶ ὑπὸ τοῖς δίφροις εἰς γῆν βλέποντα, ὡς διακόπτειν ὅτῳ ἐντυγχάνοιεν. ἡ δὲ γνώμη ἦν ὡς εἰς τὰς τάξεις τῶν Ἑλλήνων ἐλῶντα καὶ διακόψοντα.

B. Xenophon, Anabasis II.

Translate, parsing in full, and explaining construction of words underlined:—

(1) ἅμα δὲ τῇ ἡμέρᾳ συνελθόντες οἱ στρατηγοὶ ἐθαύμαζον ὅτι Κῦρος οὔτε ἄλλον πέμποι σημανοῦντα ὅ,τι χρὴ ποιεῖν οὔτε αὐτὸς φαίνοιτο. ἔδοξεν οὖν αὐτοῖς συσκευασαμένοις ἃ εἶχον καὶ ἐξοπλισαμένοις προϊέναι εἰς τὸ πρόσθεν ἕως Κύρῳ συμμίξειαν.

(2) Κλέαρχος δὲ ἐπὶ μὲν τοὺς πολεμίους οὐκ ἦγεν· ᾔδει γὰρ καὶ ἀπειρηκότας τοὺς στρατιώτας καὶ ἀσίτους ὄντας· ἤδη δὲ καὶ ὀψὲ ἦν· οὐ μέντοι οὐδὲ ἀπέκλινε, φυλαττόμενος μὴ δοκοίη φεύγειν, ἀλλ' εὐθύωρον ἄγων ἅμα τῷ ἡλίῳ δυομένῳ εἰς τὰς ἐγγυτάτω κώμας τοὺς πρώτους ἔχων κατεσκήνωσεν, ἐξ ὧν διήρπαστο ὑπὸ τοῦ βασιλικοῦ στρατεύματος καὶ αὐτὰ τὰ ἀπὸ τῶν οἰκιῶν ξύλα.

(3) πορευόμενοι δὲ ἀφίκοντο εἰς κώμας ὅθεν ἀπέδειξαν οἱ ἡγεμόνες λαμβάνειν τὰ ἐπιτήδεια. ἐνῆν δὲ σῖτος πολὺς καὶ οἶνος φοινίκων καὶ ὄξος ἕψητὸν ἀπὸ τῶν αὐτῶν. αὐταὶ δὲ αἱ βάλανοι τῶν φοινίκων οἷας μὲν ἐν τοῖς Ἕλλησιν ἔστιν ἰδεῖν τοῖς οἰκέταις ἀπέκειντο, αἱ δὲ τοῖς δεσπόταις ἀποκείμεναι ἦσαν ἀπόλεκτοι, θαυμάσιαι τοῦ κάλλους καὶ μεγέθους, ἡ δὲ ὄψις ἠλέκτρου οὐδὲν διέφερε· τὰς δέ τινας ξηραίνοντες τραγήματα ἀπετίθεσαν. καὶ ἦν καὶ παρὰ πότον ἡδὺ μέν, κεφαλαλγὲς δέ.

(4) Τί μένομεν; ἢ οὐκ ἐπιστάμεθα ὅτι βασιλεὺς ἡμᾶς ἀπολέσαι ἂν περὶ παντὸς ποιήσαιτο, ἵνα καὶ τοῖς ἄλλοις Ἕλλησι φόβος εἴη ἐπὶ βασιλέα μέγαν στρατεύειν; καὶ νῦν μὲν ἡμᾶς ὑπάγεται μένειν διὰ τὸ διεσπάρθαι αὐτῷ τὸ στράτευμα· ἐπὴν δὲ πάλιν ἁλισθῇ αὐτῷ ἡ στρατιά, οὐκ ἔστιν ὅπως οὐκ ἐπιθήσεται ἡμῖν. ἴσως δέ που ἢ ἀποσκάπτει τι ἢ ἀποτειχίζει, ὡς ἄπορος εἴη ἡ ὁδός.

(5) πρῶτον μὲν γὰρ καὶ μέγιστον οἱ θεῶν ἡμᾶς ὅρκοι κωλύουσι πολεμίους εἶναι ἀλλήλοις· ὅστις δὲ τούτων σύνοιδεν αὑτῷ παρημελημένως, τοῦτον ἐγὼ οὔποτ' ἂν εὐδαιμονίσαιμι. τὸν γὰρ θεῶν πόλεμον οὐκ οἶδα οὔτ' ἀπὸ ποίου ἂν τάχους φεύγων τις ἀποφύγοι οὔτ' εἰς ποῖον ἂν σκότος ἀποδραίη οὔθ' ὅπως ἂν εἰς ἐχυρὸν χωρίον ἀποσταίη.

(6) καὶ τοῖς μὲν τῶν πολεμίων κτήμασιν οὐκ ἐπεβούλευε· χαλεπὸν γὰρ ᾤετο εἶναι τὰ τῶν φυλαττομένων λαμβάνειν· τὰ δὲ τῶν φίλων μόνος ᾤετο εἰδέναι ῥᾷστον ὂν ἀφύλακτα λαμβάνειν. καὶ ὅσους μὲν αἰσθάνοιτο ἐπιόρκους καὶ ἀδίκους ὡς εὖ ὡπλισμένους ἐφοβεῖτο, τοῖς δὲ ὁσίοις καὶ ἀληθειαν ἀσκοῦσιν ὡς ἀνάνδροις ἐπειρᾶτο χρῆσθαι.

GREEK GRAMMAR AND PROSE COMPOSITION.

WEDNESDAY, SEPTEMBER 17TH:—AFTERNOON, 2 TO 5.

A. 1. Give acc. sing. and dat. plur. of *νοῦς, ναῦς, λέων, πόλις, πατρίς, πούς, ἡδύς* (all genders), *πολύς* (all genders), *μείζων* (all genders).

2. Give the Greek for twenty-one thousand three hundred and forty-eight, the eighth, the twentieth.

3. Give 1st plur. aor. ind. act.; 2nd sing. imp. ind. mid.; 3rd. sing. pres. subj. act.; perf. inf. act.; 2nd, plur. aor. imper. mid.; 3rd plur. pres. opt. act.; dat. plur. fut. part. act. (all genders); of *κλέπτω, ἀδικέω, ἀφίστημι, καταλαμβάνω, ἀποκτείνω.*

B. Translate into Greek:—

1. These ships are more beautiful than those of old.

2. He killed those who were captured in the same city.

3. He gave all the citizens his own money.

4. The river itself is a hundred feet broad.

5. He led his army for many days through a vast plain.

6. The general, being wise, ordered his soldiers to attack the enemy at once.

7. Their allies having arrived, they defeated and pursued the barbarians.

8. It is in my power to do good to many of my friends.

GREEK, TRANSLATION AT SIGHT.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 9 TO 10.

Translate into English:—

Ἀγησίλαος μὲν δὴ ἐν τούτοις ἦν. οἱ δὲ Λακεδαιμόνιοι ἐπεὶ σαφῶς ἤσθοντο τά τε χρήματα ἐληλυθότα εἰς τὴν Ἑλλάδα καὶ τὰς μεγίστας πόλεις συνεστηκυίας ἐπι πολέμῳ πρὸς ἑαυτούς, ἐν κινδύνῳ τε τὴν πόλιν ἐνόμισαν καὶ στρατεύειν ἀναγκαῖον ἡγήσαντο εἶναι. καὶ αὐτοὶ μὲν ταῦτα παρεσκευάζοντο, εὐθὺς δὲ καὶ ἐπὶ τὸν Ἀγησίλαον πέμπουσιν Ἐπικυδίδαν. ὁ δ' ἐπεὶ ἀφίκετο τά τε ἄλλα διηγεῖτο ὡς ἔχοι καὶ ὅτι ἡ πόλις ἐπιστέλλοι αὐτῷ βοηθεῖν ὡς τάχιστα τῇ πατρίδι.

LATIN.

WEDNESDAY, SEPTEMBER 10TH:—MORNING, 9 TO 12.

I. CAESAR AND VIRGIL.

1. Translate:—

(*a*) At barbari consilio Romanorum cognito, praemisso equitatu et essedariis, quo plerumque genere in proeliis uti consuerunt, reliquis copiis subsecuti nostros navibus egredi prohibebant. Erat ob has causas summa difficultas, quod naves propter magnitudinem nisi in alto constitui non poterant, militibus autem ignotis locis, impeditis manibus magno et gravi onere armorum oppressis, simul et de navibus desiliendum et in fluctibus consistendum et cum hostibus erat pugnandum, cum illi aut ex arido aut paulum in aquam progressi, omnibus membris expeditis, notissimis locis audacter tela conicerent et equos insuefactos incitarent.

Toto hoc in genere pugnae sub oculis omnium ac pro castris dimicaretur, intellectum est nostros propter gravitatem armorum, quod neque insequi cedentes possent neque ab signis discedere auderent, minus aptos esse ad huius generis hostem, equites autem magno cum periculo proelio dimicare, propterea quod illi etiam consulto plerumque cederent, et cum paulum ab legionibus nostros removissent, ex essedis desilirent et pedibus dispari proelio contenderent. Equestris autem proelii ratio et cedentibus et insequentibus par atque idem periculum inferebat. Accedebat huc ut numquam conferti sed rari magnisque intervallis proeliarentur, stationesque dispositas haberent, atque alios alii deinceps exciperent integrique et recentes defatigatis succederent.

2. Translate and explain the construction of italicized words and phrases:

(*a*) Dum in his locis Caesar *navium parandarum* causa *moratur*, ex magna parte Morinorum ad eum legati venerunt, qui se de superioris temporis consilio *excusarent*.

(*b*) Qui cum propter siccitates paludum quo se *reciperent* non *haberent*, *quo perfugio* superiore anno erant usi, omnes fere in potestatem Labieni pervenerunt.

(*d*) Induciomarus veritus ne *ab omnibus* desereretur legatos ad Caesarem mittit: sese id circo ab suis discedere atque ad eum venire noluisse, quo facilius

civitatem in officio *contineret*, ne omnis nobilitatis discessu plebs propter imprudentiam laberetur.

(Change into *direct narration* from *sese id circo*).

3. Translate:—

Ultro flens ipse videbar
Compellare virum, et maestas expromere voces:
O lux Dardaniae, spes o fidissima Teucrum,
Quae tantae tenuere morae? quibus Hector ab oris
Exspectate venis? ut te post multa tuorum
Funera, post varios hominumque urbisque labores
Defessi aspicimus! quae causa indigna serenos
Foedavit vultus? aut cur haec vulnera cerno?"
Ille nihil; nec me quaerentem vana moratur:
Sed graviter gemitus imo de pectore ducens,
"Heu! fuge, nate dea, teque his," ait, 'eripe flammis.
Hostis habet muros; ruit alto a culmine Troia.
Sat patriae Priamoque datum. Si Pergama dextra,
Defendi possent, etiam hac defensa fuissent.

4. (*a*) Scan the last two lines. (*b*) To whom does *ipse* refer? (*c*) Write brief notes on Hector, Priam and Pergama.

II. TRANSLATION AT SIGHT.

Exercitum cum militari more ad pugnam cohortaretur, Caesar imprimis commemoravit testibus se militibus uti posse, quanto studio pacem petisset: neque se umquam abuti (*spill*) militum sanguine neque rem publicam alterutro exercitu privare voluisse Hac habita oratione exposcentibus militibus et studio pugnae ardentibus tuba signum dedit.

Erat Crastinus evocatus (*volunteer veteran*) in exercitu Caesaris, qui superiore anno apud eum primum pilum in legione decima duxerat, vir singulari virtute. Hic signo dato, "sequimini me," inquit, "manipulares mei qui fuistis, et vestro imperatori quam constituistis operam date. Unum hoc proelium superest; quo confecto et ille suam dignitatem et nos nostram libertatem recuperabimus." Simul respiciens Caesarem, "Faciam," inquit, "hodie, imperator, ut vivo mihi aut mortuo gratias agas."

LATIN.

WEDNESDAY, SEPTEMBER 10TH:—AFTERNOON, 2 TO 5.

I. LATIN GRAMMAR.

1. Decline *locus, princeps, cornu.* Decline *orbis* with the adjective *totus* in the proper gender; *caput* with *magnus.*

2. What is the genitive plural of *senex* and *dies;* the dative plural of *vir* and *vis;* the nominative plural of *genus;* and the vocative of *deus.*

3. Decline *quis* and *unus.*

4. Give the future, second person singular, of *possum, venio, eo, vereor;* the present subjunctive first person singular of *proficiscor, conor, prosum;* the perfect subjunctive, active, third person plural, of *surgo, facio, habeo.*

5. Give the principal parts of *alo, pario, pareo, vincio, vinco, incendo, cedo, miseret,* and *cado, caedo,* compounded with *ad.*

6. Give the comparative and superlative of *miser, bonus, fortis;* form and compare adverbs from these three adjectives.

7. Write down examples of the following constructions: (*a*) the indirect object of a transitive verb; (*b*) place towards which; (*c*) dative of possessor; (*d*) partitive genitive; (*e*) complementary infinitive.

II. LATIN PROSE COMPOSITION.

1. Both I and you raised (*tollo*) our hands.

2. He said he would never do this.

3. Your good faith and dutifulness (*pietas*) are to be praised.

4. He returned home from his friends at Corinth.

5. Caesar found that the Germans were withdrawing from the Rhine into the territory of the Condrusi.

6. And now Caesar put all his legions into winter quarters, and sent letters about his victories to the senate at Rome.

7. If the auxiliaries had come up, the city would now have been taken.

8. All must die. Some desire one thing, others another.

FRENCH.

MONDAY, SEPTEMBER 15:—MORNING, 9 TO 11.30.

N. B.—*Candidates are requested to write the answers to questions in Groups* A *and* B *in separate books.*

A.

1. L'omnibus s'arrête. Deux personnes s'y hissent avec quelque peine, un homme et une femme. Comme on repart aussitôt, ils gagnent en chancelant le fond de la voiture et s'y asseyent, l'un à côté de l'autre. On descend toujours la rue, rudement cahoté, avec un grand frémissement de vitres. L'homme et la femme sont habillés de noir. Ce sont de pauvres gens, endimanchés pour un jour, jour malheureux, puisque la pluie a gâté justement leur plus belle toilette. Sur son chapeau, le mari avait mis un mouchoir dont les bouts égouttaient; avec leur seul parapluie il avait mieux aimé abriter la robe de sa femme. Sitôt assis il retira le mouchoir, le tordit entre ses genoux écartés et le remit dans sa poche après l'avoir plié. C'était un homme de petite condition, de petite vie, mieux qu'un ouvrier cependant; peut-être garçon de bureau quelque part. Sa tête, toute petite, au bout d'un long cou, était ridée et chétive. Les yeux sans cils, avec des paupières rouges, étaient constamment baissés, regardant on ne sait quoi d'invisible qui semblait le contrarier. La barbe grise, coupée très ras, faisait des ravins dans le creux de chaque ride et suivait les lignes de sa maigre mâchoire. Il avait un chapeau très lustré et trop large, car il lui descendait presque sur les yeux et n'était arrêté, de chaque côté, que par les oreilles, qui en étaient toutes rabattues.

II. Grammatical questions.

1. Give the past participle, the whole of the present indicative and the third person singular of the imperfect subjunctive of: repart, chancelant, remit, tordit, sais, suivait, rabattues.

2. Give the rules about *dont* and translate:

(*a*) The man in whose house I lived has just died.

(*b*) Whose house is this?

(*c*) The general, whose victory was unexpected, has covered himself with glory.

(*d*) The king, whose palace the enemies have destroyed, is now a beggar.

(Make use of *dont* whenever possible).

3. Distinguish between *celui* and *celui-ci*; give examples.

4. Give the rules of the subjunctive, and translate: I want you to speak to him. I wish he were here. I fear he is unable to come. I am astonished that you should be so ignorant.

B.

(*To be written in a separate book.*)

1. Translate into French :

There were one evening several travellers in a hotel. One of them, who was to start very early next morning, wished to retire before the others and asked for his room; but he was answered that the rooms were all occupied and that he would have to share the bed of a negro. To this the traveller consented. During the night the other travellers had a grotesque idea. They took a pot of paint and a brush, went up to the sleeper's room and blackened his face.

The following morning the friends entered the bedroom again, and the traveller was awakened; he got up in haste, dressed and placed himself before the looking glass to fasten his tie. At the sight of his black face he uttered a cry of surprise. "The fools," he said, "I told them to wake *me* up, and they came and awoke the negro.

Then he undressed, got into bed again, and fell asleep.

2. Story to be reproduced in French :

STORY TO BE REPRODUCED IN FRENCH.

MONDAY, SEPTEMBER 15TH:—MORNING, 11.30 TO 12.

N.B. At the beginning of the last half hour of the examination, the presiding examiner will read distinctly the following story to the candidates twice. It is not to be placed in their hands, and no notes of any kind are allowed to be taken during the reading :—

After the unfortunate attempt of King James, to recover the Crown of England, the English nobles who had embraced his cause were sentenced to death. Lord Nithisdale was to suffer the same punishment, but he

escaped through the love and the ingenuity of his wife. The wives were allowed to see their husbands on the eve of execution to bid them a last farewell. Lady Nithisdale entered the tower leaning upon two waiting women, a handkerchief to her eyes, bowed down as if broken-hearted. When inside the prison, she induced her lord, who was of the same height as herself, to exchange clothing, and to pass out in the same attidude as she had on entering ; her coach would take him to the banks of the Thames, where he would find a vessel ready to sail for France.

The plan was carried out. Lord Nithisdale vanished and arrived at three o'clock in the morning at Calais, On setting foot on land, he leapt for joy and cried: "God be praised! I am saved!" This excitement betrayed him, but he was no longer in the power of his enemies. Next morning the priest, sent to prepare the prisoner for his death, was surprised to find a woman instead of a man. The Governor of the Tower consulted the Court to learn what he should do with Lady Nithisdale. He received orders to set her free, and she went to join her husband in France.

GERMAN.

MONDAY, SEPTEMBER 15TH:—AFTERNOON, 2 TO 4.

1. Translate into English:—

(*a*) Am andern Morgen aber lief es wie ein Feuer durch das Dorf, daß der Traumjörge wiedergekommen ſei und ſich eine Frau mitgebracht habe. "Das wird auch was recht Geſcheidtes ſein," ſagten die Leute. Ich habe ſie heut früh ſchon geſehen," fiel einer der Bauern in's Wort," als ich in den Wald ging. Sie ſtand mit ihm vor der Thüre. Es iſt nichts Beſonderes, eine ganz gewöhnliche Perſon, klein und ſchmächtig. Ziemlich ärmlich war ſie auch angezogen. Wo ſoll's denn am Ende auch herkommen! Er hat nichts, da wird ſie wohl auch nichts haben!"

(*b*) Bald darauf hatte der Kronenwirth auch wieder einmal ſeine beſte Stunde, weil er nämlich rund herum ſatt war, und ſaß, die Tabaksdoſe auf dem Schooß, im Lehnſtuhl und ſchlief. Als er gar nicht wieder aufwachte, wollten ſie ihn we-

cken; da war er tot-mausetot. Da war nun der junge Handwerksbursche wirklich Kronenwirth, wie er es im Scherze gesagt, und sonst traf alles ein, wie er es unter der Buche geträumt. Denn sehr bald hatte er auch zwei Kinder, und wahrscheinlich nahm er auch einmal das eine von ihnen auf den Schooß und fütterte es und blies dabei auf den Löffel, und sicher fuhr gleichzeitig der andere Knabe mit der Moorrübe im Zimmer umher, obwohl der, vom dem ich diese Geschichte weiß, mir es nicht gesagt hat, und ich es selbst vergessen habe, ihn expreß danach zu fragen.

2. Translate into German:—

It is false whatever they may say. Whoever has money has friends. I give you the best I have. All my money is lost. I assure you that it would have given me great pleasure. He was soon to die. He has had to work all day. He ought not to have said this. She will not be able to go this evening. This book is said to have cost two hundred marks. I was told he would not go out for several weeks. It was to be expected.

3. Grammar:—

(a) Give German sentences, illustrating the various meanings of kennen, können and wissen.

(b) Show that the sentence, "the enemy was beaten at 6 o'clock" has two different meanings. How would these meanings be rendered in German.

(c) Give the rules of the order of the words in a German sentence.

(d) Give the prepositions that may govern either dative or accusative, and illustrate by German sentences.

4. Translate (at sight):—

Einem Bauer war ein Pferd gestohlen worden. Da am nämlichen Tag ein Pferdemarkt ganz in der Nähe abgehalten wurde, so ging der Bauer hin, um entweder den Dieb zu entdecken oder ein anderes Pferd zu kaufen. Wirklich sah er auch das gestohlene Pferd. Er wandte sich an den Mann, der dabei stand und sagte: "Das Pferd gehört nicht euch, sondern mir," "Ihr irrt euch" erwiderte der Andere, "ich besitze es schon seit drei Jahren." Das bezweifle ich sehr," sagte der Bauer, "aber wir werden schon sehen, wer der rechtmäßige Eigenthümer ist." Schnell deckte er dem Pferd mit beiden Händen

die Augen zu und fragte: "Auf welchem Auge ist es blind?" 'Auf dem linken," war die Antwort. Da der Bauer aber lächelte, setzte der Dieb hinzu: "Nein, ich irre mich. Auf dem rechten." "Auf keinem," rief der Bauer hocherfreut über den glücklichen Erfolg seiner List.

5. Translate:—

A king of Persia had a physician whom he sent to one of the Caliphs. When he arrived at the court the first question he asked was this: "What is your way of living here?" To which they replied: "We eat when we are hungry and we drink when we are thirsty, and we never completely satisfy our appetite." On hearing this answer the physician withdrew, for he saw that there was no work for him there.

PHYSIOGRAPHY.

TUESDAY, SEPT. 16TH:—AFTERNOON, 2 TO 3.30.

1. In what direction does the earth revolve on its axis? In what time? Give the earth's diameter and circumference, and calculate the speed of a place on the equator due to this revolution.

2. Explain why the days are long in summer and short in winter.

3. What are the chief constituents of the atmosphere? How is it affected by (1) animals, (2) fires, (3) plants, (4) bodies of water?

4. Describe and account for the Trade Winds.

5. Explain the formation of (*a*) Hail, (*b*) Dew. Where would you expect to find heavy rainfalls and why?

6. Contrast the climates of Vancouver and Montreal, and explain the difference.

7. Describe, and indicate on a rough map, the principal mountain systems of North America.

8. Name and locate an instance of each of the following:—Stalactite Caves; River Deltas; Geysers; Moraines.

Describe and explain the formation of any two.

9. Why are there so few animals in the Arctic Circle compared with the numbers and varieties in the Tropics? Can you think of any reason why the bears, foxes and other Arctic animals should be white?

BOTANY.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 5.

1. Describe the principal forms of subterranean shoots and explain their special purpose in the economy of plant life.

2. Define an inflorescence. Distinguish carefully between determinate and indeterminate types, and give examples of each.

3. Explain fully the application of the terms Hypogynous, Epigynous and Perigynous, and the cause of the relations which they indicate.

4. Describe as fully as you can the relation of wind and insects to cross-pollination, and show what differences exist between the flowers acted upon by them.

5. Describe the structure of a typical ovule, and show what this organ becomes at maturity.

6. Give an account of a simple experiment to prove the respiration of growing plants.

7. What is meant by transpiration in plants? State what organs are chiefly concerned in this function, and what results it produces in the plant.

8. Give an account of the way in which plants take up water and food from the soil, and how it is distributed in the plant.

9. Give a careful analysis of each of the three plants given, and state what classes and sub-classes they represent.

CHEMISTRY.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 3.30

(Answer eight questions only)

1. State what you know with regard to the atmosphere and the parts played by the different constituents.

2. How many cubic centimeters of Carbon Dioxide, at normal temperature and pressure, can be obtained from 15 grams of Calcium Carbonate? (Ca=40; 1 litre CO =1.97 gram).

3. Explain any four of the following terms:—Combining Proportion, Atomic Weight, Neutralization, Salt, Water of Crystallization.

4. How many grams of Caustic Soda would be required to exactly neutralize 20 grams of Nitric Acid? (Na=23).

5. Compare Chlorine, Bromine and Iodine as to their properties.

6. How does Sulphur occur in Nature? How is it purified? What gas is produced when is it burned? What are the properties of the gas?

7. Explain the luminosity of ordinary flames.

8. What takes place (*a*) when Potassium Chlorate is heated, (*b*) when Zinc is dissolved in dilute Sulphuric Acid, (*c*) when Ammonium Nitrate is heated?

9. Write formulas for any four of the following compounds:—Sal Ammoniac, Marsh Gas, Sulphuretted Hydrogen, Acid Sodium Sulphate, Orthophosphoric Acid.

PHYSICS.

TUESDAY, SEPT. 16TH:—AFTERNOON, 3.30 TO 5.

1. Describe a Spring Balance. On what property of the spring does its working depend? Give instances of *Viscosity*.

2. Describe the Common Pump, and explain its action.

3. A solid weighs 8.4 oz. in air, and 6.3 oz. in water. What is its specific gravity?

4. A conjuror keeps three balls in the air. How high must he throw them so as to have half a second between catching each ball and the next?

5. What force must be employed to give a train of 160 tons a speed of 15 miles an hour in half a minute?

6. What is *Convection* of Heat? Explain how it is used in hot-water systems of heating houses.

7. How would you test the accuracy of the freezing and boiling points of a mercury thermometer?

Convert 64 C. to Fahrenheit.

8. What is meant by Latent Heat?

One pound of ice at 0° C. is dropped into one pound of boiling water. What will be the temperature when the ice is all melted?

FIRST YEAR EXHIBITIONS.

FACULTY OF ARTS

FIRST YEAR EXHIBITIONS.

FACULTY OF ARTS.

FIRST YEAR EXHIBITIONS.

LATIN AUTHORS.

WEDNESDAY, SEPTEMBER 10TH:—9 TO 12 A.M.

I. CÆSAR, B.G. IV., V. VIRGIL, AEN. II. HORACE, ODES I. or CICERO, CATILINE, III., IV.

1. Translate:

(*a*) Dum ea *geruntur*, legione ex consuetudine una *frumentatum* missa, quae appellabatur septima, neque ulla ad id tempus belli suspicione interposita, cum pars hominum in agris remaneret, pars etiam in castra ventitaret, ii qui pro portis castrorum in statione erant Caesari nuntiaverunt pulverem maiorem quam consuetudo *ferret* in ea parte videri, quam in partem legio iter fecisset. Caesar id quod erat suspicatus, aliquid *novi* a barbaris initum *consilii*, cohortes quae in stationibus erant secum in eam partem proficisci, ex reliquis duas in stationem cohortes succedere, reliquas armari et confestim sese subsequi iussit.

(*b*) Ex his omnibus longe sunt humanissimi qui Cantium incolunt, quae regio est maritima omnis, neque multum a Gallica differunt consuetudine. Interiores plerique frumenta non serunt, sed *lacte* et carne vivunt, pellibusque sunt vestiti. Omnes vero se Britanni vitro inficiunt, quod caeruleum efficit colorem, atque hoc horridiores sunt in pugna adspectu: capilloque sunt promisso atque omni parte corporis rasa praeter caput et labrum superius.

(*c*) Turrim, in praecipiti stantem summisque sub astra
Eductam tectis, unde omnis Troia videri
Et Danaum solitae naves et Achaia castra,
Aggressi ferro circum, quo summa labantes
Iuncturas tabulata dabant, convellimus altis
Sedibus, impulimusque: ea lapsa repente ruinam
Cum sonitu trahit, et Danaum super agmina late
Incidit. Ast alii subeunt; nec saxa, nec ullum
Telorum interea cessat genus.

2. (*a*) Explain the construction of italicised words in the above extracts. (*b*) Scan the first two lines of 1. (*c*).

3. Translate either (*a*) or (*b*), with brief notes on words in italics:

(*a*)

Teucer Salamina patremque
Cum fugeret, tamen uda *Lyaeo*
Tempora populea fertur vinxisse corona,
Sic tristes adfatus amicos:
Quo nos *cumque* feret melior fortuna parente,
Ibimus, o socii comitesque!
Frui paratis et valido mihi,
Latoe, dones ac precor integra
Cum mente, nec turpem senectam
Degere nec cithara carentem.

(*b*) Ac ne longum *sit, Quirites, tabellas* proferri iussimus, quae a quoque dicebantur datae. Primum ostendimus *Cethego* signum: cognovit. Nos incidimus: legimus. Erat scriptum ipsius manu Allobrogum senatui et populo, sese quae eorum legatis *confirmasset* facturum esse; orare ut item illi facerent quae sibi eorum legatum recepissent.

Qua re mihi cum perditis civibus aeternum bellum susceptum esse video. Id ego vestro bonorumque omnium auxilio, memoriaque tantorum periculorum,—quae non modo in hoc populo, qui servatus est, sed in omnium gentium sermonibus ac mentibus semper haerebit,—a me et a meio facile propulsari posse confido. Neque ulla profectio tanta vis reperietur, quae coniunctionem vestram equitumque Romanorum, et tantam conspirationem bonorum omnium, confringere et labefactare possit.

4. Answer any *four* of the following questions:—

(*a*) Nihilo tamen setius principibus Trevirorum ad se convocatis, hos singillatim Cingetorigi conciliavit. What peculiarity of expression do you notice here? Can you account for the violation of the rule?

(*b*) Explain the following terms: *sarcinae, turma, vineae, sagum, tessera.*

(*c*) Iam summas arces Tritonia, respice, Pallas
Insedit, nimbo effulgens et Gorgone saeva.

What is the explanation of *nimbo* and *Gorgone saeva?* Another reading in *limbo*—What would be the meaning?

(*d*) Write, for each of the following verses, the scheme of metre of which it is an example:—

Nil desperandum Teucro duce et auspice Teucro
Volcanus ardens urit officinas.
Vite bibentem

(*e*) Write a brief note on the following words and phrases:—

(*i*) clientelis hospitiisque.
(*ii*) sella curulis.
(*iii*) pulvinaria
(*iv*) tribuni aerarii

II. TRANSLATION AT SIGHT.

Tempore ruricolae patiens fit taurus aratri,
Praebet et incurvo colla premenda iugo.
Tempore paret equus lentis animosus habenis,
Et placido duros accipit ore lupos.
Tempore Poenorum compescitur ira leonum,
Nec feritas animo, quae fuit ante, manet.
Quaeque sui monitis obtemperat Inda magistri
Bellua, servitium tempore victa subit.
Tempus ut extentis tumeat facit uva racemis,
Vixque merum capiant grana, quod intus habent,
Tempus et in canas semen producit aristas,
Et ne sint tristi poma sapore facit.
Hoc tenuat dentem terras renovantis aratri,
Hoc rigidas silices, hoc adamanta terit.
Hoc etiam saevas paulatim mitigat iras
Hoc minuit luctus, maestaque corda levat.
Cuncta potest igitur tacito pede lapsa vetustas
Praeterquam curas attenuare meas.
Fortior in fulva novus est luctator harena,
Quam cui sunt tarda bracchia fessa mora:
Integer est melior nitidis gladiator in armis,
Quam cui tela suo sanguine tincta rubent:
Fert bene praecipites navis modo facta procellas;
Quamlibet exiguo solvitur imbre vetus.
Nos quoque, quae ferimus, tulimus patientius ante,
Et mala sunt longo multiplicata die.

LATIN GRAMMAR AND LATIN PROSE COMPOSITION.

WEDNESDAY, SEPT. 10TH:—AFTERNOON, 2 TO 4.30.

I. LATIN GRAMMAR.

1. Show in tabular form the classification of the consonants.

2. Mark the quantity of the vowels in the following words: *infans, mater, amant, agri, volucris.* Mark, underneath each syllable, the syllabic quantity of the same words.

3. Account for the *o* in *copia,* the penultimate *u* in *saeculum,* the *p* in *scripsi,* and the form *eicio.*

4. Give the gen. sing. of *Vergilius,* the gender of *humus,* acc. sing. of *securis,* dat. pl. of *bos,* the gen. sing. and gend. of *caro,* loc. of *domus,* and two forms of the dat. sing. of *fructus.*

5. Decline *plus.* Compare *egens,* and *humilis.*

6. Form and compare an adverb from *levis.*

7. Write down the infin. pass. of *amo,* the sec. per. sing. pres. and imperf. subj. pass. of *moneo,* the gerund of *eo,* the imperative (in full) of *nolo.*

8. Give the prin. parts of *sono, oblino, obliviscor, veto, rado.*

9. Explain the following constructions: (*a*) Corinthi, urbe praeclara; (*b*) galeam induitur; (*c*) illud glorior; (*d*) mihi persuadetur; (*e*) quid sibi vult?

10. Illustrate, by examples, the following constructions in Latin: (*a*) dative of agency; (*b*) objective gen.; (*c*) genitive with impersonal verbs; (*d*) ablative of manner; (*e*) epistolary imperfect.

II. LATIN PROSE COMPOSITION.

1. The conspiracy was formed in the reign of Tarquin.

2. He hopes to come to Rome.

3. It is clear that if Nero had lived, they would have made war on Rome.

4. We must spare our enemies.

5. When Caesar had come to the enemy's camp, the Germans were so alarmed at his sudden arrival, that the throng of women and children took to flight in every direction before time was given to hold a council or ascertain whether the cavalry or Caesar himself with all his forces had arrived.

6. On the previous day the enemy, when repulsed, had escaped danger by their quickness of flight, yet Caesar decided that the best thing to be done was to draw up his legions before the camp and give battle.

7. (*Indirect narration*) "There are no fields vacant in Gaul," replied Caesar, "which I can give to those with whom I have no friendship, and especially to those who do not protect their own fields. But you may, if you wish, settle in the territories of the Ubii."

HIGHER COMPOSITION AND TRANSLATION AT SIGHT.

WEDNESDAY, SEPT. 10TH:—AFTERNOON, 4.30 TO 5.30.

I.

Put in indirect discourse after Crassus dicit:

At the break of day he drew up all his forces and marshalled them in a double line. The auxiliaries he stationed in the centre, and waited to see what plan the enemy would adopt. Although they supposed they might fight safely, yet they thought it safer to gain the victory without a wound by cutting off the provisions. If the Romans should begin to retreat, they intended to attack them, since they would be encumbered in their march. They approved of this plan, and although the leaders led forth the Romans, yet they kept themselves in the camp. When Crassus observed this, he marched to the camp of the enemy, to the great satisfaction of all his soldiers.

II.

De origine Curtii Rufi, quem gladiatore genitum quidam prodidere, neque falsa prompserim et vera exsequi pudet. Postquam adolevit, sectator quaestoris cui Africa obtigerat, dum in oppido Adrumeto, vacuis per

medium diei porticibus secretus agitat, oblata ei species muliebris ultra modum humanum, et audita est vox: "Tu es, Rufe, qui in hanc provinciam pro consule venies." Tali omine in spem sublatus degressusque in Urbem, largitione amicorum, simul acri ingenio, quaesturam et mox nobiles inter candidatos praeturam principis suffragio assequitur: cum hisce verbis Tiberius dedecus natalium eius velavisset, "Curtius Rufus videtur mihi ex se natus." Longa post haec senecta, et adversus superiores tristi adulatione, arrogans minoribus, inter pares difficilis, consulare imperium, triumphi insignia, ac postremo Africam obtinuit: atque ibi defunctus, fatale praesagium implevit.

LATIN.

TRANSLATION AT SIGHT.

WEDNESDAY, SEPTEMBER 10TH:—MORNING, 9 TO 12.

Note.—This paper is intended for those only who do not offer the prescribed books.

(*a*) Phocion Atheniensis etsi saepe exercitibus praefuit summosque magistratus cepit, tamen multo eius notior integritas vitae quam rei militaris labor. Itaque huius memoria est nulla, illius autem magna fama, ex quo cognomine Bonus est appellatus. Fuit enim perpetuo pauper, cum divitissimus esse posset propter frequentes delatos honores potestatesque summas, quae ei a populo dabantur. Hic cum a rege Philippo munera magnae pecuniae repudiaret, legatique hortarentur accipere simulque admonerent, si ipse iis facile careret, liberis tamen suis prospiceret, quibus difficile esset in summa paupertate tantam paternam tueri gloriam, his ille "si mei simies erunt, idem hic" inquit "agellus illos alet, qui me ad hanc dignitatem perduxit: sin dissimiles sunt futuri, nolo meis impensis illorum ali augerique luxuriam."

Idem cum prope ad annum octogesimum prospera pervenisset fortuna, extremis temporibus magnum in odium pervenit suorum civium, primo, quod cum Demade de urbe tradenda Antipatro consenserat eiusque consilio Demosthenes cum ceteris, qui bene de re publica meriti existimabantur, populi scito in exsilium erant expulsi. Neque in eo solum offenderat, quod

patriae male consuluerat, sed etiam, quod amicitiae fidem non praestiterat. Namque auctus adiutusque a Demosthene eum, quem tenebat, ascenderat gradum, cum adversus Charetem eum subornaret: ab eodem in iudiciis, cum capitis causam diceret, defensus aliquotiens, liberatus discesserat. Hunc non solum in periculis non defendit, sed etiam prodidit. Concidit autem maxime uno crimine, quod, cum apud eum summum esset imperium populi, et Nicanorem, Cassandri praefectum, insidiari Piraeo Atheniensium a Dercylo moneretur idemque postularet ut provideret, ne commeatibus civitas privaretur, huic audiente populo Phocion negavit esse periculum seque ejus rei obsidem fore pollicitus est. Neque ita multo post Nicanor Piraeo est potitus. Ad quem reciperandum cum populus armatus concurrisset, ille non modo neminem ad arma vocavit, sed ne armatis quidem praeesse voluit. Sine quo Athenae omnino esse non possunt.

(*b*) Atque illi, ut vacuo patuerunt aequore campi,
procursu rapido, coniectis eminus hastis,
invadunt Martem clipeis atque aere sonoro.
Dat gemitum tellus; tum crebros ensibus ictus
congeminant; fors et virtus miscentur in unum.
Ac velut ingenti Sila summove Taburno
cum duo conversis inimica in proelia tauri
frontibus incurrunt; pavidi cessere magistri;
stat pecus omne metu mutum mussantque iuvencae,
quis nemori inperitet, quem tota armenta sequantur;
illi inter sese multa vi volnera miscent
cornuaque obnixi infigunt et sanguine largo
colla armosque lavant; gemitu nemus omne remugit:
non aliter Tros Aeneas et Daunius heros
concurrunt clipeis; ingens fragor aethera conplet.
Iuppiter ipse duas aequato examine lances
sustinet et fata inponit diversa duorum,
quem damnet labor et quo vergat pondere letum.
Emicat hic, inpune putans, et corpore toto
alte sublatum consurgit Turnus in ensem,
et ferit. Exclamant Troes trepidique Latini,
arrectaeque amborum acies. At perfidus ensis
frangitur in medioque ardentem deserit ictu,
ni fuga subsidio subeat. Fugit ocior Euro,
ut capulum ignotum dextramque aspexit inermem.
Fama est, praecipitem, cum prima in proelia iunctos

conscendebat equos, patrio mucrone relicto,
dum trepidat, rerrum aurigae rapuisse Metisci;
idque diu, dum terga dabant palantia Teucri,
suffecit; postquam arma dei ad Volcania ventum est,
mortalis mucro, glacies ceu futilis, ictu
dissiluit; fulva resplendent fragmina harena.

GREEK AUTHORS.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 10 TO 12.

Candidates should write on A (1) or A (2),
and B,
and C (1) or C (2) or C (3).

Translate, with notes on words and phrases underlined:—

A (1) XENOPHON, ANABASIS I.

(*a*) εἷς δὲ δὴ εἶπε προσποιούμενος σπεύδειν ὡς τάχιστα πορεύεσθαι εἰς τὴν Ἑλλάδα στρατηγοὺς μὲν ἑλέσθαι ἄλλους ὡς τάχιστα, εἰ μὴ βούλεται Κλέαρχος ἀπάγειν· τὰ δ' ἐπιτήδει' ἀγοράζεσθαι—ἡ δ' ἀγορὰ ἦν ἐν τῷ βαρβαρικῷ στρατεύματι—καὶ συσκευάζεσθαι· ἐλθόντας δὲ Κῦρον αἰτεῖν πλοῖα, ὡς ἀποπλέοιεν· ἐὰν δὲ μὴ διδῷ ταῦτα, ἡγεμόνα αἰτεῖν Κῦρον ὅστις διὰ φιλίας τῆς χωρας ἀπάξει. ἐὰν δὲ μηδὲ ἡγεμόνα διδῷ, συντάττεσθαι τὴν ταχίστην, πέμψαι δὲ καὶ προκαταληψομένους τὰ ἄκρα, ὅπως μὴ φθάσωσι μήτε Κῦρος μήτε οἱ Κίλικες καταλαβόντες, ὧν πολλοὺς καὶ πολλὰ χρήματα ἔχομεν ἀνηρπακότες.

(*b*) τὸ δὲ σύμπαν δῆλος ἦν Κῦρος ὡς σπεύδων πᾶσαν τὴν ὁδὸν καὶ οὐ διατρίβων ὅπου μὴ ἐπισιτισμοῦ ἕνεκα ἤ τινος ἄλλου ἀναγκαίου ἐκαθέζετο, νομίζων, ὅσῳ μὲν θᾶττον ἔλθοι, τοσούτῳ ἀπαρασκευοτέρῳ βασιλεῖ μαχεῖσθαι, ὅσῳ δὲ σχολαίτερον, τοσούτῳ πλέον συναγείρεσθαι βασιλεῖ στράτευμα. καὶ συνιδεῖν δ' ἦν τῷ προσέχοντι τὸν νοῦν ἡ βασιλέως ἀρχὴ πλήθει μὲν χώρας καὶ ἀνθρώπων ἰσχυρὰ οὖσα, τοῖς δὲ μήκεσι τῶν ὁδῶν καὶ τῷ διεσπάσθαι τὰς δυνάμεις ἀσθενής, εἴ τις διὰ ταχέων τὸν πόλεμον ποιοῖτο.

A (2) XENOPHON, ANABASIS II.

(*a*) ἐπεὶ δὲ Κῦρος τέθνηκεν, οὔτε βασιλεῖ ἀντιποιούμεθα τῆς ἀρχῆς οὔτ' ἔστιν ὅτου ἕνεκα βουλοίμεθα ἂν τὴν βασιλέως χώραν κακῶς ποιεῖν, οὐδ' αὐτὸν ἀποκτεῖναι ἂν

ἐθέλοιμεν, πορευοίμεθα δ' ἂν οἴκαδε, εἰ μὴ ἡμᾶς μὴ λυποίη· ἀδικοῦντα μέντοι πειρασόμεθα σὺν τοῖς θεοῖς ἀμύνασθαι· ἐὰν μέντοι τις ἡμᾶς καὶ εὖ ποιῶν ὑπάρχῃ, καὶ τούτου εἷς γε δύναμιν οὐχ ἥττησόμεθα εὖ ποιοῦντες.

(*b*) παντάπασι δὲ ἀπόρων ἐστὶ καὶ ἀμηχάνων καὶ ἐν ἀνάγκῃ ἐχομένων, καὶ τούτων πονηρῶν, οἵτινες ἐθέλουσι δι' ἐπιορκίας τε πρὸς θεοὺς καὶ ἀπιστίας πρὸς ἀνθρώπους πράττειν τι. οὐχ οὕτως ἡμεῖς, ὦ Κλέαρχε, οὔτε ἀλόγιστοι οὔτε ἠλίθιοί ἐσμεν. ἀλλὰ τί δὴ ὑμᾶς ἐξὸν ἀπολέσαι οὐκ ἐπὶ τοῦτο ἤλθομεν; εὖ ἴσθι ὅτι ὁ ἐμὸς ἔρως τούτου αἴτιος τὸ τοῖς Ἕλλησιν ἐμὲ πιστὸν γενέσθαι, καὶ ὦ Κῦρος ἀνέβη ξενικῷ διὰ μισθοδοσίας πιστεύων τούτῳ ἐμὲ καταβῆναι δι' εὐεργεσίας ἰσχυρόν.

B. Homer, Odyssey, XVII.

(*a*) αἲ γάρ, Ζεῦ τε πάτερ καὶ Ἀθηναίη καὶ Ἄπολλον,
τοῖος ἐών, οἷός ποτ' ἐυκτιμένῃ ἐνὶ Λέσβῳ
ἐξ ἔριδος Φιλομηλείδῃ ἐπάλαισεν ἀναστάς,
κάδ δ' ἔβαλε κρατερῶς, κεχάροντο δὲ πάντες Ἀχαιοί,
τοῖος ἐὼν μνηστῆρσιν ὁμιλήσειεν Ὀδυσσεύς·
πάντες κ' ὠκύμοροί τε γενοίατο πικρόγαμοί τε.
ταῦτα δ', ἅ μ' εἰρωτᾷς καὶ λίσσεαι, οὐκ ἂν ἐγώ γε
ἄλλα παρὲξ εἴποιμι παρακλιδόν, οὐδ' ἀπατήσω·
ἀλλὰ τὰ μέν μοι ἔειπε γέρων ἅλιος νημερτής,
τῶν οὐδέν τοι ἐγὼ κρύψω ἔπος οὐδ' ἐπικεύσω.
φῆ μιν ὅ γ' ἐν νήσῳ ἰδέειν κρατέρ' ἄλγε' ἔχοντα
νύμφης ἐν μεγάροισι Καλυψόος, ἥ μιν ἀνάγκῃ
ἴσχει· ὁ δ' οὐ δύναται ἣν πατρίδα γαῖαν ἱκέσθαι.

(*b*) ἔνθ' ἦ τοι μὲν ἐγὼ κελόμην ἐρίηρας ἑταίρους
αὐτοῦ πὰρ νήεσσι μένειν καὶ νῆας ἔρυσθαι,
ὀπτῆρας δὲ κατὰ σκοπιὰς ὤτρυνα νέεσθαι·
οἳ δ' ὕβρει εἴξαντες, ἐπισπόμενοι μένεϊ σφῷ,
αἶψα μάλ' Αἰγυπτίων ἀνδρῶν περικαλλέας ἀγροὺς
πόρθεον, ἐκ δὲ γυναῖκας ἄγον καὶ νήπια τέκνα
αὐτούς τ' ἔκτεινον· τάχα δ' ἐς πόλιν ἵκετ' αὐτή.
οἳ δὲ βοῆς ἀίοντες ἅμ' ἠοῖ φαινομένηφιν
ἦλθον· πλῆτο δὲ πᾶν πεδίον πεζῶν τε καὶ ἵππων
χαλκοῦ τε στεροπῆς. ἐν δὲ Ζεὺς τερπικέραυνος
φύζαν ἐμοῖς ἑτάροισι κακὴν βάλεν, οὐδέ τις ἔτλη
στῆναι ἐναντίβιον· περὶ γὰρ κακὰ πάντοθεν ἔστη.

Scan the last four lines.

C (1) Euripides, Hecuba (Sidgwick's Scenes).

(*a*) ΕΚ. ὦ φίλτατ', ἆρα κἄμ' ἐπισφάξαι τάφῳ
δοκοῦν 'Αχαιοῖς ἦλθες; ὡς φίλ' ἂν λέγοις.
σπεύδωμεν, ἐγκονῶμεν, ἡγοῦ μοι, γέρον.
ΤΑ. σὴν παῖδα κατθανοῦσαν ὡς θάψῃς, γύναι,
ἦκω μεταστείχων σε· πέμπουσιν δέ με
δισσοί τ' 'Ατρεῖδαι καὶ λεὼς 'Αχαϊκός.
ΕΚ. οἴμοι, τί λέξεις; οὐκ ἄρ' ὡς θανουμένους
μετῆλθες ἡμᾶς, ἀλλὰ σημανῶν κακά;
ὄλωλας, ὦ παῖ, μητρὸς ἁρπασθεῖσ' ἄπο·
ἡμεῖς δ' ἄτεκνοι τοὐπὶ σ'· ὦ τάλαιν' ἐγώ.
πῶς καί νιν ἐξεπράξατ'; ἆρ' αἰδούμενοι
ἢ πρὸς τὸ δεινὸν ἦλθεθ', ὡς ἐχθράν, γέρον,
κτείνοντες; εἰπέ, καίπερ οὐ λέξων φίλα.

(*b*) χρῆν σ', εἴπερ ἦσθα τοῖς 'Αχαιοῖσιν φίλος,
τὸν χρυσὸν ὃν φῂς οὐ σόν, ἀλλὰ τοῦδ' ἔχειν,
δοῦναι φέροντα πενομένοις τε καὶ χρόνου
πολὺν πατρῴας γῆς ἀπεξενωμένοις·
σὺ δ' οὐδὲ νῦν πω σῆς ἀπαλλάξαι χερὸς
τολμᾷς, ἔχων δὲ καρτερεῖς ἔτ' ἐν δόμοις.
καὶ μὴν τρέφων μὲν ὥς σε παῖδ' ἐχρῆν τρέφειν
σώσας τε τὸν ἐμόν, εἶχες ἂν καλὸν κλέος·
ἐν τοῖς κακοῖς γὰρ ἀγαθοὶ σαφέστατοι
φίλοι· τὰ χρηστὰ δ' αὖθ' ἕκαστ ἔχει φίλους.
εἰ δ' ἐσπάνιζες χρημάτων, ὁ δ' ηὐτύχει,
θησαυρὸς ἄν σοι παῖς ὑπῆρχ' οὑμὸς μέγας·

C (2) Homer, Iliad I.

(*a*) καὶ νῦν ἐν Δαναοῖσι θεοπροπέων ἀγορεύεις,
ὡς δὴ τοῦδ' ἕνεκά σφιν ἑκηβόλος ἄλγεα τεύχει,
οὕνεκ' ἐγὼ κούρης Χρυσηίδος ἀγλαὰ ποινα
οὐκ ἔθελον δέξασθαι,—ἐπεὶ πολὺ βούλομαι αὐτὴν
οἴκοι ἔχειν. καὶ γάρ ῥα Κλυταιμνήστρης προβέβουλα,
κουριδίης ἀλόχου, ἐπεὶ οὔ ἑθέν ἐστι χερείων,
οὐ δέμας οὐδὲ φυήν, οὔτ' ἄρ φρένας οὔτε τι ἔργα.
ἀλλὰ καὶ ὥς ἐθέλω δόμεναι πάλιν, εἰ τό γ' ἄμεινον·
βούλομ' ἐγὼ λαὸν σόον ἔμμεναι ἢ ἀπολέσθαι.
αὐτὰρ ἐμοὶ γέρας αὐτίχ' ἑτοιμάσατ', ὄφρα μὴ οἶος
Ἀργείων ἀγέραστος ἔω, ἐπεὶ οὐδὲ ἔοικεν·
λεύσσετε γὰρ τό γε πάντες, ὅ μοι γέρας ἔρχεται ἄλλῃ.

(b) τοῖσιν δ' ἴκμενον οὖρον ἴει ἑκάεργος Ἀπόλλων.
οἱ δ' ἱστὸν στήσαντ', ἀνά θ' ἱστία λευκὰ πέτασσαν·
ἐν δ' ἄνεμος πρῆσεν μέσον ἱστίον, ἀμφὶ δὲ κῦμα
στείρῃ πορφύρεον μεγάλ' ἴαχε νηὸς ἰούσης·
ἡ δ' ἔθεεν κατὰ κῦμα διαπρήσσουσα κέλευθον.
αὐτὰρ ἐπεί ῥ' ἵκοντο κατὰ στρατὸν εὐρὺν Ἀχαιῶν,
νῆα μὲν οἵ γε μέλαιναν ἐπ' ἠπείροιο ἔρυσσαν
ὑψοῦ ἐπὶ ψαμάθοις, ὑπὸ δ' ἔρματα μακρὰ τάνυσσαν,
αὐτοὶ δ' ἐσκίδναντο κατὰ κλισίας τε νέας τε.

C (3) HOMER, ILIAD VI.

(a) εἰ δέ τις ἀθανάτων γε κατ' οὐρανοῦ εἰλήλουθας,
οὐκ ἂν ἐγώ γε θεοῖσιν ἐπουρανίοισι μαχοίμην.
οὐδὲ γὰρ οὐδὲ Δρύαντος υἱὸς κρατερὸς Λυκόοργος
δὴν ἦν, ὅς ῥα θεοῖσιν ἐπουρανίοισιν ἔριζεν,
ὅς ποτε μαινομένοιο Διωνύσοιο τιθήνας
σεῦε κατ' ἠγάθεον Νυσήιον· αἱ δ' ἅμα πᾶσαι
θύσθλα χαμαὶ κατέχευαν, ὑπ' ἀνδροφόνοιο Λυκούργου
θεινόμεναι βουπλῆγι· Διώνυσος δὲ φοβηθεὶς
δύσεθ' ἁλὸς κατὰ κῦμα, Θέτις δ' ὑπεδέξατο κόλπῳ
δειδιότα· κρατερὸς γὰρ ἔχε τρόμος ἀνδρὸς ὁμοκλῇ.

(b) ὣς εἰπὼν οὔ παιδὸς ὀρέξατο φαίδιμος Ἕκτωρ·
ἂψ δ' ὁ πάις πρὸς κόλπον ἐυζώνοιο τιθήνης
ἐκλίνθη ἰάχων, πατρὸς φίλου ὄψιν ἀτυχθείς,
ταρβήσας χαλκόν τε ἰδὲ λόφον ἱππιοχαίτην,
δεινὸν ἀπ' ἀκροτάτης κόρυθος νεύοντα νοήσας.
ἐκ δ' ἐγέλασσε πατήρ τε φίλος καὶ πότνια μήτηρ
αὐτίκ' ἀπὸ κρατὸς κόρυθ' εἵλετο φαίδιμος Ἕκτωρ,
καὶ τὴν μὲν κατέθηκεν ἐπὶ χθονὶ παμφανόωσαν,
αὐτὰρ ὅ γ' ὃν φίλον υἱὸν ἐπεὶ κύσε πῆλέ τε χερσίν
εἶπεν ἐπευξάμενος Διί τ' ἄλλοισίν τε θεοῖσιν·

GREEK, TRANSLATION AT SIGHT.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 9 TO 10.

Translate into English:—

(*a*) Ἐπεὶ δὲ ἐκεῖσε ἀφίκετο, πρῶτον μὲν Τισσαφέρνης πέμψας ἤρετο αὐτὸν τίνος δεόμενος ἥκοι. ὁ δ' εἶπεν αὐτονόμους καὶ τὰς ἐν τῇ Ἀσίᾳ πόλεις εἶναι, ὥσπερ καὶ τὰς ἐν τῇ παρ' ἡμῖν Ἑλλάδι. πρὸς ταῦτ' εἶπεν ὁ Τισσαφέρνης, Εἰ τοίνυν θέλεις σπείσασθαι ἕως ἂν ἐγὼ πρὸς βασιλέα πέμψω, οἶμαι ἄν σε ταῦτα διαπραξάμενον ἀποπλεῖν, εἰ βούλοιο. Ἀλλὰ βουλοίμην ἄν, ἔφη, εἰ μὴ οἰοίμην γε ὑπὸ σοῦ ἐξαπατᾶσθαι. ἀλλ' ἔξεστιν, ἔφη, σοι τούτων πίστιν λαβεῖν ἢ μὴν ἀδόλως σοῦ πράττοντος ταῦτα ἡμᾶς μηδὲν τῆς σῆς ἀρχῆς ἀδικήσειν ἐν ταῖς σπονδαῖς.

GREEK GRAMMAR, COMPOSITION, HIGHER COMPOSITION AND HIGHER SIGHT TRANSLATION.

WEDNESDAY, SEPTEMBER 17TH:—AFTERNOON, 2 TO 5.

A. 1. Give acc. plur., dat. plur. and gender of *ναῦς χάρις, πατρίς, πόλις, γέρων, ἡγεμών, πούς, ὀδούς, γυνή γάλα, μάρτυς.*

2. Give dat. sing. and gen. plur., in all genders, of *πᾶς, πολύς, ἡδύς, οὗτος, ὅστις, λύων.*

3. Give 1st plur. aor. ind. act.; 2nd, sing. imp. ind. mid.; 3rd, sing. pres. subj. act.; perf. inf. act.; 2nd, plur. aor. imper. mid.; 1st, plur. pres. opt. act.; 3rd, plur. aor. opt. pass.; dat. plur. fut. part. act. (all genders) of *πλέκω, χρυσόω, καθίστημι, καθαιρέω, μένω,* giving only the forms in actual use in Attic prose.

4. With what cases are the following prepositions used, and with what differences of meaning: *ἐπί, κατά, μετά, πρός*?

B. Translate into Greek:—

1. He sent away all the ships out of the harbour.

2. The men of old, who won noble victories, are worthy of honour.

3. Having come to the city, he put to death those who had injured him.

4. Having marched all day, they came to a river 234 feet broad.

5. The general ordered his infantry to attack those who were encamped on the plain.

6. They gave pledges that they would not invade the enemies' country.

C. Translate into Greek:—

When the allies had arrived, the general decided to attack the enemies' camp at once. So he posted his cavalry on his right, and himself led the way, commanding the infantry in the centre. When they came near, the enemy saw them and were greatly alarmed; for they had not thought he would attack, while he had fewer men than themselves. For the Lacedaemonians, as men thought, were not skilful at attacking fortified places. As soon as the battle began, an eagle flew towards the camp, and the barbarians, considering this to be an omen, and fearing that the gods, being hostile, would bring defeat and death upon them if they remained, fled, leaving their camp to the attackers.

D. Translate into English:—

Ἐπεὶ δ' ἦλθον εἰς Λακεδαίμονα οἱ ἐκπεπτωκότες Ῥοδίων ὑπὸ τοῦ δήμου, ἐδίδασκον ὡς οὐκ ἄξιον εἴη περιδεῖν Ἀθηναίους Ῥόδον καταστρεψαμένους καὶ τοσαύτην δύναμιν συνθεμένους. γνόντες οὖν οἱ Λακεδαιμόνιοι ὡς εἰ μὲν ὁ δῆμος κρατήσοι, Ἀθηναίων ἔσται Ῥόδος ἅπασα· εἰ δὲ οἱ πλουσιώτεροι, ἑαυτῶν. ἐπλήρωσεν αὐτοῖς ναῦς ὀκτώ, ναύαρχον δὲ Ἔκδικον ἐπέστησαν. συνεξέπεμψαν δ' ἐπὶ τούτων τῶν νεῶν καὶ Διφρίδαν ἐκέλευσαν δ' αὐτὸν διαβάντα εἰς τὴν Ἀσίαν τάς τε Θίβρωνα ὑποδεξαμένας πόλεις διασώζειν, καὶ στράτευμα τὸ περισωθὲν ἀναλαβόντα καὶ ἄλλο, εἴ ποθεν δύναιτο, συλλέξαντα πολεμεῖν πρὸς Στρούθαν.

GREEK COMPOSITION AND SIGHT TRANSLATION.

(For those who do not offer prescribed books).

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 10 TO 12.

A. Translate into Greek:—

1. When the ships entered the harbour, those in the city fled.
2. Though they were more numerous than the enemy, they feared to attack.
3. He held a review of all the cavalry who were present.
4. Why did we not put to death those who betrayed their own country?
5. The soldiers on the walls saw that their allies were conquering.
6. Having marched five parasangs, he built a large bridge.
7. Shall we send messengers bearing gifts to the king?
8. It is better to obey than to be put to death by those more powerful.

B. Translate into English:—

Ὅτε δ' αὕτη ἡ μάχη ἐγένετο, Τισσαφέρνης ἐν Σάρδεσιν ἔτυχεν ὤν· ὥστε ἠτιῶντο οἱ Πέρσαι προδεδόσθαι ὑπ' αὐτοῦ. γνοὺς δὲ καὶ αὐτὸς ὁ Περσῶν βασιλεὺς Τισσαφέρνην αἴτιον εἶναι τοῦ κακῶς φέρεσθαι τὰ αὑτοῦ, Τιθραύστην καταπέμψας ἀποτέμνει αὐτοῦ τὴν κεφαλήν. τοῦτο δὲ ποιήσας ὁ Τιθραύστης πέμπει πρὸς τὸν Ἀγησίλαον πρέσβεις λέγοντας, Ὦ Ἀγησίλαε, ὁ μὲν αἴτιος τῶν πραγμάτων καὶ ὑμῖν καὶ ἡμῖν ἔχει τὴν δίκην· βασιλεὺς δὲ ἀξιοῖ σὲ μὲν ἀποπλεῖν οἴκαδε, τὰς δ' ἐν τῇ Ἀσίᾳ πόλεις αὐτονόμους οὔσας τὸν ἀρχαῖον δασμὸν αὐτῷ ἀποφέρειν.

GEOMETRY.

THURSDAY, SEPTEMBER 11TH:—MORNING, 9 TO 12.

1. Any two sides of a triangle are together greater than the third side.

(*a*) The difference of any two sides of a triangle is less than the third side.

2. The complements of the parallelograms about the diagonal of any parallelogram are equal to one another.

3. Bisect a triangle by a straight line drawn from a given point in one of its sides.

4. Describe a square equal to a given rectilineal figure.

5. The sum of the squares on the sides of a parallelogram is equal to the sum of the squares on the diagonals.

6. If a straight line be divided into any two parts, the sum of the squares on the whole line and on one of the parts is equal to twice the rectangle contained by the whole line and that part together with the square on the other part.

7. Draw a tangent to a circle from a given point without the circle.

(*a*) Shew that two square tangents may be drawn from the same point.

8. If a straight line touch a circle and from the point of contact a chord be drawn, the angles which this chord makes with the tangent shall be equal to the angles in the alternate segment.

9. Describe a circle which shall pass through three given points not in the same straight line.

ALGEBRA.

THURSDAY, SEPTEMBER 11TH:—AFTERNOON, 2 TO 5.

A.—ALGEBRA.

1. Reduce to its lowest terms

$$\frac{x^3 - 3a^2x + 2a^3}{2x^3 + ax^2 + a^2x - 4a^3}$$

2. Solve the following equations:—

(*a*) $\dfrac{x-4}{x-5} - \dfrac{x-5}{x-6} = \dfrac{x-7}{x-8} - \dfrac{x-8}{x-9}$

(*b*) $1 \overline{x+14} \mid 1 \overline{x-14} - 14$

(c) $\frac{x+y}{3}+x=15,\ \frac{x-y}{5}+y=6$

3. If the numerator of a certain fraction be increased by one, and the denominator be diminished by one, the value will be one; if the numerator be increased by the denominator, and the denominator diminished by the numerator, the value will be four: find the fraction.

4. Solve the following:

(a) $\frac{2x}{x+2}+\frac{x+2}{2x}=2.$

(b) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,\ \frac{x}{a}+\frac{y}{b}=1$

5. Simplify

$$2\sqrt[3]{4}+5\sqrt[3]{32}-\sqrt[3]{108}.$$

Rationalize the denominator of

$$\frac{2\sqrt{3}+3\sqrt{2}}{3\sqrt{3}-2\sqrt{5}}$$

Find the value of

$$\sqrt[3]{3}\times\sqrt[4]{4}\times\sqrt[6]{648}$$

MATHEMATICS, PART II.

TUESDAY, SEPT. 16TH:—MORNING, 9 TO 12.30.

GEOMETRY.

1. (1) Describe an isosceles triangle having each of the base angles double of the vertical angle.

(2) What are the relations connecting the vertical

angle and the equal base angles in the other isosceles triangles of the figure?

(3) If the two circles of the figure intersect in D and E, and A is the centre of the larger one, show that ADE is another isosceles triangle having each of the base angles double of the vertical angle.

2. (1) If, of three straight lines, the rectangle contained by the extremes be equal to the square on the mean, the three straight lines will be proportionals.

(2) Show that the base of one of the isosceles triangles in the figure of question 1 is a mean proportional between those of the other two.

3. Parallelograms which are equiangular to one another, have to one another the ratio which is compounded of the ratios of their sides.

ALGEBRA.

4. If $\frac{p}{\sqrt{b-c}} = \frac{q}{\sqrt{c-a}} = \frac{r}{\sqrt{a-b}}$, show that $p^2 + q^2 + r^2 = 0$.

5. How many numbers of four figures, in each of which the figures are all different, contain 0?

How many do not contain 0?

6. Insert three geometric means, two arithmetic means, and one harmonic mean, between 2 and 18.

7. Expand $(1 + 2x)^{-\frac{1}{2}}$ to four terms by the Binomial Theorem.

8. (1) Prove that the sum of the logarithms of two numbers is equal to the logarithm of their product.

(2). Find the value of $\log \sqrt{2} + \frac{1}{2} \log (x-3) - \log (x-9)^2$ when $x = 8$.

TRIGONOMETRY.

9. The circular (radian) measure of an angle at the centre of a circle is equal to the ratio of the subtending arc to the radius.

10. Express $\sin A$, $\cos A$, etc., in terms of $\operatorname{cosec} A$.

11. Given $\tan A = 1$, what is the least positive value of A? What is the second least positive value of A? Answer the same questions, gven $\sec A = \sqrt{2}$

12. Express the ratios of $90°-A$, and those of $270°-A$ in terms of those of A.

13. Prove that

(1) $\cot^2 A - \cos^2 A = \cos^4 A \operatorname{cosec}^2 A$,

(2) $\sin^2 A + \cos^4 A = \cos^2 A + \sin^4 A$,

(3) $\sin (A + B) = \sin A \cos B + \cos A \sin B$.

(4) $\cos A + \cos B = 2 \cos \frac{1}{2}(A + B) \cos \frac{1}{2}(A - B)$,

(5) $\dfrac{1 + \sin A}{1 + \cos A} = \frac{1}{2}(1 + \tan \frac{1}{2} A)^2$.

14. Solve the equation

$$8 \sin^4 \theta - 6 \sin^2 \theta + 1 = 0$$

for positive values of θ less than 360°.

ENGLISH GRAMMAR.

FRIDAY, SEPTEMBER 12TH:—MORNING, 9 TO 12.30.

(Candidates will answer the whole of the paper set for matriculation, and also the following questions).

1. Classify and illustrate the vowel sounds used in standard English.

2. Supply the ellipses in:

(*a*) The city rose as one man against the tyrant.

(*b*) He was as busy as possible.

(*c*) He works for the same wages as before.

(*d*) He has built a larger house than his brother.

(*e*) He has built a larger house than his brother's.

(*f*) What wax so frozen but dissolves with tempering.

3. Indicate the chief marks of the three leading Early English dialects.

4. Write etymological notes on *island, kirk, alchemy, busk, woman, drake, bridegroom, gander, heifer, madam.*

5. What light does older English throw on the use, form or inflection of the following words:—*mine, self, who, one, twain, pound* (noun), easy *to do, why, him, seldom?*

ENGLISH LITERATURE.

MILTON:—SHORTER POEMS.

FRIDAY, SEPTEMBER 12TH:—AFTERNOON, 4.30 TO 5.30.
(*To be taken with matriculation paper. The answers must be written in a separate book*).

1. Make a short parallel analysis of the two poems, L'Allegro and Il Penseroso.

2. Explain clearly each of the following, and refer the lines to their contexts:—

(*a*) Their martyred blood and ashes sow.
(*b*) Nor yet where Deva spreads her wizard stream.
(*c*) And on the neck of crowned Fortune proud,
Hast reared God's trophies.
(*d*) Then lies him down the lubber fiend.
(*e*) Met in the milder shades of purgatory.
(*f*) Comes the blind Fury with the abhorred shears.

3. State the facts which underlie the story of Lycidas, and show how Milton elaborated these.

MACAULAY'S ESSAYS.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 4.

1. "We often hear it said that the world is constantly becoming more and more enlightened, and that this enlightening must be favourable to Protestantism and unfavourable to Catholicism. But we see great reason to doubt whether this be a well-founded expectation." Develop Macaulay's argument in full.

2. What, in detail, was "the fourth great peril of the Church of Rome"?

3. Make notes on: Frederick II.; Spain in the Age of Luther; the Theatines; Edinburgh and Florence; Sir Thomas More.

4. Sketch the War of the Austrian Succession.

5. What do you know of Frederic the Great as a man of letters?

6. Make notes on: Frederic's Commercial policy; the Campaign of 1757; Pope Clement XIII; Maupertuis; the condition of Prussia in 1763.

ENGLISH COMPOSITION.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 4 TO 5.30.

Write an essay of not less than three pages on any *one* of the following subjects.

(*a*) The Moral Lesson of *Comus*.
(*b*) Macaulay on Ignatius Loyola.
(*c*) The Personal Character of Frederick the Great.

ENGLISH LITERATURE.

MORLEY'S FIRST SKETCH, CHAPS. VII AND VIII.

THURSDAY, SEPTEMBER 18TH:—MORNING, 9 TO 11.

1. Make a list of the most important Elizabethan translations with the names of their authors.

2. State what you know of the first English comedy and the first English tragedy.

3. Give the names of the chief dramatists of the period, arranging them in three lists as predecessors, contemporaries, or successors of Shakespeare.

4. Mention the most important works of the following authors:—Roger Ascham, Walter Raleigh, Richard Hooker, Joseph Hall, Thomas Browne, William Selden, Richard Hakluyt.

5. Summarize the argument of one of Milton's prose works.

FRENCH.

MONDAY, SEPTEMBER 15TH: —MORNING, 9 TO 12.

1. Translate into French:

A man had a very lazy son, whom he wished to induce to get up earlier. With this object, he told him that some one, by getting up very early, had found a purse full of gold. "That may be," replied the slothful fellow, "but the man who lost it had got up earlier." "That is not proved," returned the father; "It is much more likely that the purse had lain there since the previous evening, and that it had been lost by a belated traveler, who did not start early enough."

2. Translate into English:

Je voyais un hêtre monter à une prodigieuse hauteur. Du sommet presque jusqu'au bas, il étalait d'énormes branches, qui couvraient la terre alentour, de sorte qu'elle était nue; il n'y avait pas un seul brin d'herbe. Du pied du géant partait un chêne qui, après s'être élevé de quelques pieds, se courbait, se tordait, puis s'étendait horizontalement, puis se relevait encore et se tordait de nouveau; et enfin, on l'apercevait allongeant sa tête maigre et dépouillée sous les branches vigoureuses du hêtre, pour chercher un peu d'air et un peu de lumière.

Et je pensai en moi-même: voilà comment les petits croissent à l'ombre des grands.—LAMENNAIS.

3. Give the primitive tenses of the following verbs:—naître, conquérir, mourir, voir, asseoir.

4. What are the orthographical changes in the conjugation of the verbs ending in *ger, eler, eter*?

5. When is the pronoun *soi* used?

6. State five different cases where the subjunctive mood is used in French, and illustrate by examples.

7. Translate into English:

Mais au fait! pensai-je, si j'étais à une lieue d'ici, entre deux brigands, il ne serait pas trop malaisé de les gagner de vitesse. Le danger doublerait mes forces, il n'en faut point douter. Celui qui court le mieux est celui qui a le plus grand intérêt à courir.

Pourquoi le lièvre est-il le plus vite de tous les animaux parce qu'il est le plus menacé?.

J'acceptai l'offre du Roi, et, séance tenante, il plaça deux gardes du corps auprès de ma personne. Il ne leur fit pas de recommandations minutieuses. Il leur dit simplement:

"C'est un milord de quinze mille francs; si vous le laissez perdre, il faudra le payer ou le remplacer."—ABOUT.

8. Write in French a *résumé* of *Melle de la Seigliere.*

9. Give the English equivalents of the following expressions taken from that play: (1) Vous nous la donnez belle. (2) Je ne me soucie pas mal du siècle. (3)

Il s'agit de courir un cerf. (4) Chanson que tout cela. (5) Vous me poussez à bout. (6) Vous saurez à quoi vous en tenir. (7) Il sera tenu de déguerpir. (8) Vous voilà dans une jolie passe. (9) Je n'en reviens pas! (10) Une fée qui m'en veut a traversé toutes mes démarches.

GERMAN.

MONDAY, SEPTEMBER 15TH:—AFTERNOON, 2 TO 5.

1. Translate:—

(*a*) In Königsberg, wohin er sich gewandt hatte, gedachte er die Gerechtigkeit, die ihm und seinem Hause bislang versagt worden war, mit kühner Selbstanklage zu erzwingen. Unter diesen Berührungen mit der Außenwelt, die in seltsamer Weise erkältend und ernüchternd auf ihn wirkten, begann die fieberhafte Gereiztheit seines Wesens allgemach zu schwinden. Er sah sich Gründen und nicht mehr Flüchen, Worten und nicht mehr Knütteln gegenüber. Das that ihm wohl und beruhigte ihn. Er entwarf Pläne und bereitete mit Umsicht vor, was die Zukunft von ihm forderte.

(*b*) Wer wird gleich so gotteslästerliche Reden führen! Ich bin die Obrigkeit und darf so was nicht gehört haben. Aber was kann dem Zorne wehren, wenn er überschwillt und sich in Verwünschungen Luft macht? Und so wünsche ich, unser aller Feind und Verderber möchte diese Nacht in seinem Bette sterben oder er möchte verschwinden auf Nimmerwiedersehen. Aber das wird ja nicht der Fall sein. Morgen wird er angeritten kommen und wird meinen Felix zur Schlachtbank schleppen, und die, welche im Gliede gemurrt haben, wird er auch angeben.

(*c*) Ihr könntet euch entschließen, hier zu leben,
In meinem Vaterlande mein zu sein?
O Bertha, all mein Sehnen in das Weite,
Was war es, als ein Streben nur nach euch?
Euch sucht' ich einzig auf dem Weg des Ruhmes,
Und all mein Ehrgeiz war nur meine Liebe.
Könnt ihr mit mir euch in dies stille Thal
Einschließen und der Erde Glanz entsagen—
O, dann ist meines Strebens Heil gefunden.

Dann mag der Strom der wildbewegten Welt
An's sichre Ufer dieser Berge schlagen—
Kein flüchtiges Verlangen hab' ich mehr
Hinauszusenden in des Lebens Weiten—
Dann mögen diese Felsen um uns her
Die undurchdringlich feste Mauer breiten,
Und dies verschlossne sel'ge Thal allein
Zum Himmel offen und gelichtet sein!

2. Translate (unseen): —

(*a*) In wenigen Tagen waren die Legionen marschbereit, und man brach auf. Der Weg führte die Lippe hinauf über Aliso zu dem Teutoburger Walde hin. In einigen Tagen schon war man in jener Gegend. Aber das gute Wetter, welches bisher den Marsch begünstigt hatte, ließ nach; drohende Wolken jagten vom Winde getrieben am Himmel dahin, und die Luft war mit Nebeln angefüllt. Schon bewegte sich das Heer durch die engen Waldschluchten, als der Regen in Strömen herabzufließen begann. Nur mit Mühe kam man vorwärts; denn der Boden wurde weicher und weicher, so daß die schwer bewaffneten Soldaten bis an die Kniee einsanken. Am meisten Mühe aber hatte der Troß. Stets mußte eine Menge der Soldaten dazu verwendet werden, die Wagen mit dem Gepäck, mit den Weibern und Kindern vorwärts zu bringen. Es war erst gegen zwei Uhr nachmittags, und doch begann es bereits zu dunkeln; auch erhob sich ein heftiger Wind, der den mühsam vorwärtsstrebenden Soldaten den Regen gerade ins Gesicht trieb. Alles sehnte sich nach Ruhe. Die fröhliche Stimmung, welche bisher das Heer beseelt hatte, wich einer großen Niedergeschlagenheit. Überdies sah man häufig da und dort durch das Waldesdunkel verdächtige Gestalten huschen, und fernerhin war trotz der Verabredung von dem Heerbann Hermanns noch nichts zu sehen.

(*b*) Durch weises Verfahren brachte es Bismarck dahin, daß endlich im Dezember 1870 der König Ludwig von Bayern den König von Preußen einlud, den Titel eines deutschen Kaisers anzunehmen und damit die alte Herrlichkeit von „Kaiser und Reich" wieder aufleben zu lassen. Die Erfüllung dieses Wunsches wurde dem König Wilhelm 1. nicht leicht. Was er als König von Preußen war, das wußte er gewiß; der Kaiser sollte erst werden.

Der treue Rat Bismarcks half ihm über jedes Bedenken hinweg. Als am 18. Januar (1871) im Spiegelsaal des Versailler Schlosses die Kaiserproklamation stattfand, und Bismarck, nun nicht mehr Bundeskanzler, sondern Reichskanzler, mit lauter Stimme die Proklamation des Kaisers an das deutsche Volk verlas, als dann der Großherzog von Baden das erste Hoch auf den neuen deutschen Kaiser ausbrachte, und der Kronprinz als des Kaisers erster Unterthan huldigend seinem Vater nahte—da stand Bismarck mit tiefbewegtem, glücklichem Herzen am Ziel einer langen, schweren Lebensarbeit. Es war eine große, weltgeschichtliche Stunde, eine Stunde Gottes.

3. Grammar:—

(a) Translate into German, using exclusively the passive voice:—

He has been promised help.
There was dancing and singing the whole night.
He was often thought of.
He was frequently laughed at.

(b) Distinguish between:—

er sagte mir and er sagte zu mir.
er gehört mir and er gehört zu mir.

(c) Which of the following conjunctions are co-ordinative, which are adverbial, and which subordinative? State what influence each class has on the arrangement of words in a sentence: weil; denn; da; als; ob; sowohl; als auch; obwohl; gleichwohl; sondern; doch; also; obgleich.

(d) State under what circumstances the direct order of a principal clause must be inverted. Give examples.

4. Translate:—

Once at Carthage there was a slave named Androcles, who was so badly treated by his master that he resolved to run away from him. He therefore secretly left his master's house, and hid himself in a forest, some miles distant from the city. After wandering about for some time, he came to a large cavern, and, overcome by hunger and fatigue, he lay down in it, and soon fell fast asleep. He was suddenly awakened by the roar of a wild beast; and running to the mouth of the cavern, he was met by a great lion, which stood right in his way, and made it

impossible for him to escape. Androcles expected to be at once torn to pieces; but, to his great surprise, the lion came gently towards him, without showing any signs of rage. He gave forth at the same time a low and mournful sound, as if he were begging his assistance.

or :—

Am andern Morgen lief es wie Feuer durch das Dorf, daß der Traumjörge wieder gekommen sei und sich eine Frau mitgebracht habe. "Das wird auch was recht Gescheidtes sein," sagten die Leute. "Ich habe sie heute früh schon gesehen," fiel einer von den Bauern in's Wort, "als ich in den Wald ging, Sie stand mit ihm vor der Thüre. Es ist nichts Besonderes. eine ganz gewöhnliche Person, klein und schmächtig. Ziemlich ärmlich war sie auch angezogen. Wo soll's denn am Ende auch herkommen! Er hat nichts, da wird sie wohl auch nichts haben!"

"Vergiß nicht, daß ich große Ansprüche mache. Wenn mir eine Prinzessin gefallen soll, muß sie klug und schön sein! Und dann ist noch ein Punkt, auf den ich ganz besonderes Gewicht lege; du weißt wie gern ich Pfeffernüsse esse. In meinem ganzen Reiche ist kein einziger Mensch, der sie zu backen versteht, wenigstens richtig zu backen, nicht zu hart und nicht zu weich, sondern gerade knusprig: sie muß durchaus Pfeffernüsse backen können." Als der Minister dies hörte bekam er einen heftigen Schreck. Doch sammelte er sich rasch wieder und entgegnete: "Ein König, wie Ew. Majestät, werden ohne Zweifel auch eine Prinzessin finden, die Pfeffernüsse zu backen versteht."

SECOND YEAR EXHIBITIONS

FACULTY OF ARTS

SECOND YEAR EXHIBITIONS.

GREEK AUTHORS.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 9 TO 12.

A.—LUCIAN: CHARON AND SOMNIUM.

Translate with notes on words and phrases underlined:—

(1). ΕΡΜ. *θάρρει· ἀσφαλῶς ἕξει ἅπαντα. μετατίθει τὴν Οἴτην· ἐπικυλινδείσθω ὁ Παρνασός. ἰδοὺ δή ἐπάνειμι αὖθις· εὖ ἔχει· πάντα ὁρῶ· ἀνάβαινε ἤδη καὶ σύ.*

ΧΑΡ. *ὄρεξον, ὦ Ἑρμῆ, τὴν χεῖρα· οὐ γὰρ ἐπὶ μικράν με ταύτην μηχανὴν ἀναβιβάζεις.*

ΕΡΜ. *εἴ γε καὶ ἰδεῖν ἐθέλεις, ὦ Χάρων, ἅπαντα. οὐκ ἔνι δὲ ἄμφω, καὶ ἀσφαλῆ καὶ φιλοθεάμονα εἶναι. ἀλλ' ἔχου μου τῆς δεξιᾶς καὶ φείδου μὴ κατὰ τοῦ ὀλισθηροῦ πατεῖν. εὖ γε, ἀνελήλυθας καὶ σύ· καὶ ἐπείπερ δικόρυμβος ὁ Παρνασός ἐστι, μίαν ἑκάτερος ἄκραν ἀπολαβόμενοι καθεζώμεθα· σὺ δέ μοι ἤδη ἐν κύκλῳ περιβλέπων ἐπισκόπει ἅπαντα.*

(2). ΕΡΜ. *ἐλπίδες, ὦ Χάρων, καὶ δείματα καὶ ἄγνοιαι καὶ ἡδοναὶ καὶ φιλαργυρίαι καὶ ὀργαὶ καὶ μίση καὶ τὰ τοιαῦτα. τούτων δὲ ἡ ἄγνοια μὲν κάτω συναναμέμικται αὐτοῖς καὶ συμπολιτεύεταί, καὶ νὴ Δία καὶ τὸ μῖσος καὶ ἡ ὀργὴ καὶ ζηλοτυπία καὶ ἀμαθία καὶ ἀπορία καὶ φιλαργυρία· ὁ φόβος δὲ καὶ αἱ ἐλπίδες ὑπεράνω πετόμενοι ὁ μὲν ἐμπίπτων ἐκπλήττει ἐνίοτε καὶ ὑποπτήσσειν ποιεῖ, αἱ δ' ἐλπίδες ὑπὲρ κεφαλῆς αἰωρούμεναι, ὁπόταν μάλιστα οἴηταί τις ἐπιλήψεσθαι αὐτῶν, ἀναπτάμεναι οἴχονται κεχηνότας αὐτοὺς ἀπολιποῦσαι, ὅπερ καὶ τὸν Τάνταλον κάτω πάσχοντα ὁρᾷς ὑπὸ τοῦ ὕδατος.*

(3). *καὶ ὁ νῦν πένης ὁ τοῦ δεῖνος, ὁ βουλευσάμενος περὶ ἀγεννοῦς οὕτω τέχνης, μετ' ὀλίγον ἅπασι ζηλωτὸς καὶ ἐπίφθονος ἔσῃ, τιμώμενος καὶ ἐπαινούμενος καὶ ἐπὶ τοῖς ἀρίστοις εὐδοκιμῶν καὶ ὑπὸ τῶν γένει καὶ πλούτῳ προυχόντων ἀποβλεπόμενος, ἐσθῆτα μὲν τοιαύτην ἀμπεχόμενος,—δείξασα τὴν ἑαυτῆς· πάνυ δὲ λαμπρὰν ἐφόρει—ἀρχῆς δὲ καὶ προεδρίας ἀξιούμενος· κἄν που ἀποδημῇς οὐδ' ἐπὶ τῆς ἀλλοδαπῆς ἀγνὼς καὶ ἀφανὴς ἔσῃ· τοιαῦτά σοι περιθήσω τὰ γνωρίσματα, ὥστε τῶν ὁρώντων ἕκαστος τὸν πλησίον κινήσας δείξει σε τῷ δακτύλῳ "οὗτος ἐκεῖνος" λέγων.*

B.—EURIPIDES; MEDEA.

(1). καίτοι τοκάδος δέργμα λεαίνης
ἀποταυροῦται δμωσὶν, ὅταν τις
μῦθον προφέρων πέλας ὁρμηθῇ.
σκαιοὺς δὲ λέγων κοὐδέν τι σοφοὺς
τοὺς πρόσθε βροτοὺς οὐκ ἂν ἁμάρτοις,
οἵτινες ὕμνους ἐπὶ μὲν θαλίαις
ἐπί τ' εἰλαπίναις καὶ παρὰ δείπνοις
ηὕροντο, βίου τερπνὰς ἀκοάς.
στυγίους δὲ βροτῶν οὐδεὶς λύπας
ηὕρετο μούσῃ καὶ πολυχόρδοις
ᾠδαῖς παύειν, ἐξ ὧν θάνατοι
δειναί τε τύχαι σφάλλουσι δόμους.

(2). ΑΙ. τί φῄς; σαφῶς μοι σὰς φράσον δυσθυμίας.
ΜΗ. ἀδικεῖ μ' Ἰάσων οὐδὲν ἐξ ἐμοῦ παθών.
ΑΙ. τί χρῆμα δράσας; φράζε μοι σαφέστερον.
ΜΗ. γυναῖκ' ἐφ' ἡμῖν δεσπότιν δόμων ἔχει.
ΑΙ. ἦ που τετόλμηκ' ἔργον αἴσχιστον τόδε;
ΜΗ. σάφ' ἴσθ'· ἄτιμοι δ' ἐσμὲν οἱ πρὸ τοῦ φίλοι.
ΑΙ. πότερον ἐρασθεὶς ἢ σὸν ἐχθαίρων λέχος;
ΜΗ. μέγαν γ' ἔρωτα—πιστὸς οὐκ ἔφυ φίλοις;—
ΑΙ. ἴτω νυν· εἴπερ ὡς λέγεις ἐστὶν κακός,—
ΜΗ. ἀνδρῶν τυράννων κῆδος ἠράσθη λαβεῖν.

(3). ᾤμωξε δ' εὐθὺς καὶ περιπτύξας δέμας
κυνεῖ προσαυδῶν τοιάδ'· ὦ δύστηνε παῖ,
τίς σ' ὧδ' ἀτίμως δαιμόνων ἀπώλεσεν;
τίς τὸν γέροντα τύμβον ὀρφανὸν σέθεν
τίθησιν; οἴμοι, ξυνθάνοιμί σοι, τέκνον.
ἐπεὶ δὲ θρήνων καὶ γόων ἐπαύσατο,
χρῄζων γεραιὸν ἐξαναστῆσαι δέμας,
προσεί̈χεθ', ὥστε κισσὸς ἔρνεσιν δάφνης,
λεπτοῖσι πέπλοις, δεινὰ δ' ἦν παλαίσματα·
ὁ μὲν γὰρ ἤθελ' ἐξαναστῆσαι γόνυ,
ἡ δ' ἀντελάζυτ'· εἰ δὲ πρὸς βίαν ἄγοι,
σάρκας γεραιὰς ἐσπάρασσ' ἀπ' ὀστέων.

C.—Domosthenes; Olynthiacs, I and II.

(1). ἀλλ' οἶμαι παρόμοιόν ἐστιν ὅπερ καὶ περὶ τῆς τῶν χρημάτων κτήσεως· ἂν μὲν γάρ, ὅσ' ἄν τις λάβῃ, καὶ σώσῃ, μεγάλην ἔχει τῇ τύχῃ τὴν χάριν, ἂν δ' ἀναλώσας λάθῃ, συνανήλωσε καὶ τὸ μεμνῆσθαι τὴν χάριν. καὶ περὶ τῶν πραγμάτων οὕτως οἱ μὴ χρησάμενοι τοῖς καιροῖς ὀρθῶς, οὐδ' εἰ συνέβη τι παρὰ τῶν θεῶν χρηστὸν μνημονεύουσι· πρὸς γὰρ τὸ τελευταῖον ἐκβὰν ἕκαστον τῶν προϋπαρξάντων κρίνεται.

(2). τῶν ἀτοπωτάτων μέντἂν εἴη, εἰ ἃ νῦν ἄνοιαν ὀφλισκάνων ὅμως ἐκλαλεῖ, ταῦτα δυνηθεὶς μὴ πράξει. ἀλλὰ μὴν ἡλίκα γ' ἐστὶν τὰ διάφορ' ἐνθάδ' ἢ 'κεῖ πολεμεῖν, οὐδὲ λόγου προσδεῖν ἡγοῦμαι. εἰ γὰρ ὑμᾶς δεήσειεν αὐτοὺς τριάκονθ' ἡμέρας ἔξω γενέσθαι, καὶ ὅσ' ἀνάγκη στρατοπέδῳ χρωμένους τῶν ἐκ τῆς χώρας λαμβάνειν, μηδενὸς ὄντος ἐν αὐτῇ πολέμου λέγω, πλείον' ἂν οἶμαι ζημιωθῆναι τοὺς γεωργοῦντας ὑμῶν, ἢ ὅσ' εἰς ἅπαντα τὸν πρὸ τοῦ χρόνον δεδαπάνησθε.

(3). δῆλον δ' ὅτι ταῦτ' ἐστὶν ἀληθῆ· καὶ γὰρ οὓς ἐνθένδε πάντες ἀπήλαυνον, ὡς πολὺ τῶν θαυματοποιῶν ἀσελγεστέρους ὄντας, Καλλίαν ἐκεῖνον τὸν δημόσιον καὶ τοιούτους ἀνθρώπους, μίμους γελοίων καὶ ποιητὰς αἰσχρῶν ᾀσμάτων, ὧν εἰς τοὺς συνόντας ποιοῦσιν εἵνεκα τοῦ γελασθῆναι, τούτους ἀγαπᾷ καὶ περὶ αὑτὸν ἔχει. καίτοι ταῦτα, καὶ εἰ μικρά τις ἡγεῖται, μεγάλ' ὦ ἄνδρες Ἀθηναῖοι δείγματα τῆς ἐκείνου γνώμης καὶ κακοδαιμονίας ἐστὶ τοῖς εὖ φρονοῦσιν.

GREEK TRANSLATION AT SIGHT.

Wednesday, September 17th:—Morning, 9 to 10.

Translate into English:—

μετὰ μὲν τοίνυν τοῦτο οἱ μὲν Κορίνθιοι καὶ Ἀργεῖοι τοὺς νεκροὺς ὑποσπόνδους ἀπήγοντο. οἱ δὲ σύμμαχοι τῶν Λακεδαιμονίων ἐβοήθουν. ἐπεὶ δὲ ἠθροίσθησαν, ἔγνω Πραξίτας πρῶτον μὲν τῶν τειχῶν καθελεῖν ὥστε δίοδον στρατοπέδῳ ἱκανὴν εἶναι, ἔπειτα δ' ἀναλαβὼν τὸ στράτευμα ἦγε τὴν ἐπὶ Μέγαρα, καὶ αἱρεῖ προσβαλὼν πρῶτον μὲν Σιδοῦντα, ἔπειτα δὲ Κρομμυῶνα. καὶ ἐν τούτοις τοῖς τείχεσι καταστήσας φρουροὺς τοὔμπαλιν ἐπορεύετο· καὶ τειχίσας Ἐπιεικίαν, ἵνα φρούριον εἴη πρὸ τῆς φιλίας τοῖς συμμάχοις, οὕτω διαφῆκε τὸ στράτευμα. καὶ αὐτὸς τὴν ἐπὶ Λακεδαίμονα ἀπεχώρει.

GREEK COMPOSITION, GRAMMAR AND HISTORY.

WEDNESDAY, SEPTEMBER 17TH:—AFTERNOON, 2 TO 5.

A.

Translate into Greek:—

The Greeks used to think that it was a good man's duty to help his friends and injure his enemies. Accordingly Socrates, who considered that to be punished was a beneficial thing, driving out, as it were, an evil disease from the soul, taught that one ought to bring one's friends to justice, that they might be benefited thereby and get rid of the evil in them. If, on the other hand, one's enemy did wrong, a good man (he said), should aid him to escape the penalty in every way, that he might in nowise be benefited by the laws and become better, and thus receive good from an enemy instead of harm.

B.

1. Give 1st plur. aor. opt. act.; 2nd sing. fut. ind. mid.; dat. plur. masc. aor. part. act. of *τείνω*, *ἀπόλλυμι* *καταλαμβάνω*, *ἀφίστημι*, *γιγνώσκω*, *εὑρίσκω*, *φαίνω*.

2. State the various ways of expressing purpose in Greek, and compare them with the Latin usages.

3. Classify the uses of the Greek dative.

C.

1. What were the constitutional changes due to Cleisthenes?

2. Write an account of the Ionic revolt, and indicate its bearings on the later history of Greece.

3. With what events are the following connected:—Œnophyta, Eurymedon, Sybota, Naxos, Mycalé? Give dates.

4. What do you know of:—Ephialtes, Cylon, Hiero, Polycrates, Draco?

LATIN.

AUTHORS AND UNSEEN TRANSLATION.

WEDNESDAY, SEPTEMBER 10TH:—MORNING, 9 TO 12.

1. Translate:—

(*a*) O Tite, si quid ego adiuero curamve levasso
quae nunc te coquit et versat in pectore fixa
ecquid erit praemi?

Licet enim mihi versibus eisdem adfari te, Attice, quibus adfatur Flamininum.

ille vir haud magna cum re sed plenus fidei,
Quamquam certo scio non, ut Flamininum,
sollicitari te, Tite, sic noctesque diesque,

novi enim moderationem animi tui et aequitatem teque non cognomen solum Athenis deportasse sed humanitatem et prudentiam intellego.

To whom is this addressed?

What do you observe irregular in the line 'ille vir, etc.'?

Explain cognomen Athenis deportare.

(*b*) At minus habeo virium quam vestrum utervis. Ne vos quidem T. Pontii centurionis vires habetis: num idcirco est ille praestantior? Moderatio modo virium adsit et tantum quantum potest quisque nitatur, ne ille non magno desiderio tenebitur virium.

A note on the force of 'at' and the second 'ne'. What limitations are there to the use of the latter?

2. Translate and comment upon the following:—

(*a*) Manent ingenia senibus. The use of the plural.

(*b*) Addiscunt aliquid. The force of 'ad'.

(*c*) Habent aliquid excusationis non illius quidem instae sed quae probari posse videatur.

A note on illius quidem.

(*d*) At est eo meliore condicione quam adolescens cum id, quod ille sperat, hic consecutus est.

3. Translate:—

Adduxere sitim tempora, Virgili;
sed pressum Calibus ducere Liberum
si gestis, iuvenum nobilium cliens,
nardo vina mereberis.
Nardi parvus onyx eliciet cadum,
qui nunc Sulpiciis accubat horreis,
spes donare novas largus amaraque
curarum eluere efficax.

Ad quae si properas gaudia cum tua
velox merce veni: non ego te meis
immunem meditor tingere poculis
plena dives ut in domo.
Verum pone moras et studium lucri
nigrorumque memor, dum licet, ignium
misce stultitiam consiliis brevem:
dulce est decipere in loco.

What is the metre of the above? Give a scheme of the Alcaic and Sapphic metres.

4. Translate:—

(a) Nam Ciceronem cuicumque eorum fortiter opposuerim. Nec ignoro quantam mihi concitem pugnam, cum praesertim non sit id propositi ut eum Demostheni comparem hoc tempore; neque enim attinet cum Demosthenem in primis legendum vel ediscendum potius putem. Quorum ego virtutes plerasque arbitror similes, consilium ordinem, dividendi, praeparandi, probandi rationem, omnia denique quae sunt inventionis. In eloquendo est aliqua diversitas: densior ille hic copiosior, ille concludit astrictius hic latius, pugnat ille acumine semper hic frequenter et pondere, illi nihil detrahi potest huic nihil adici curae plus in illo in hoc naturae. Salibus certe et commiseratione, qui duo plurimum affectus valent, vincimus.

(b) A philosophorum vero lectione ut essent multa nobis petenda vitio factum est oratorum qui quidem illis optima sui operis parte cesserunt.

5. What does Quintilian say of Aeschylus, Menander Theocritus, Tibullus, Caesar, Livy? Quote his words where you can.

FOR UNSEEN TRANSLATION.

6. Si tibi occurrerit vetustis arboribus et solitam altitudinem egressis frequens lucus et conspectum caeli ramorum aliorum alios protegentium umbra submovens: illa proceritas silvae et secretum loci et admiratio umbrae in aperto tam densae atque continuae fidem tibi numinis facit, et si quis specus saxis penitus exesis montem suspenderit non manu factus sed naturalibus causis in tantam laxitatem excavatus, animum tuum quadam religionis suspicione percutiet. Magnorum fluminum capita

veneramur, subita ex abdito vasti amnis eruptio aras habet, coluntur aquarum colentium fontes et stagna quaedam vel opacitas vel immensa altitudo sacravit: si hominem videris interritum periculis, intactum cupiditatibus, inter adversa felicem, in mediis tempestatibus placidum, ex superiore loco homines videntem, ex aequo deos; non subibit te eius veneratio? non dices; ista res maior est altiorque quam ut credi similis huic in quo est corpusculo possit. Seneca, Epist. Mor. IV., 12.

LATIN PROSE AND GRAMMAR AND ROMAN HISTORY.

WEDNESDAY, SEPTEMBER 10TH:—AFTERNOON, 2 TO 5.

1. For Latin Prose.

I know not whether much of this is not to be imputed to ourselves. We trust the rudder of a vessel, where a few sailors and some goods alone are in jeopardy, to none but skilful pilots; but the state, wherein the safety of so many thousands is concerned, we put into any practice his art; a prince need only be born. Yet gov- hands. A charioteer must learn, reflect upon, and ernment, as it is the most honorable, is also the most difficult of all sciences. We choose the master of a ship; and shall we not choose one who is to have the care of many cities and so many souls? But the usage is too long established for us to subvert it. Do we not see that noble cities are erected by the people; that they are destroyed by princes? That the community grows rich by the industry of its citizens, is plundered by the rapacity of its princes—that good laws are enacted by popular magistrates, are violated by these princes—that the people love peace but princes excite war?

2. Indicate by a translation the difference between the English and Latin idioms in the following:—

(*a*) Tu illud dixisti bene Latine parum plane.
(*b*) In manibus alicuius mori.
(*c*) Scriptores primae classis.
(*d*) Tamquam alter idem.
(*f*) Opinionis error.
(*e*) Bene emere.
(*g*) Bellum Helvetiorum.

(*h*) Gener meus et Piso gener.
(*i*) Pomponiam meis verbis saluta.
(*k*) Luctus et squalor.
(*l*) Multae et magnae contentiones.

2. What errors do you notice in the Latinity of the following:—

(*a*) Multitudo copiarum.
(*b*) Audeo te sapientem esse dicere.
(*c*) Abi, respondit, ad patrem.
(*d*) Ut iam supra diximus.
(*e*) Epistolae ad diversos.
(*f*) Fratri meo magna est comitas.
(*g*) Vulfius, vir immortalis.
(*h*) In Plutarcho legimus.
(*i*) Ab eo inde tempore
(*j*) Caesar et Pompeius et infiniti alii.

4. Comment on the Grammar or Latinity of the following:—

(*a*) Coeptum est fieri. Bell. Afr.
(*b*) Cogito Romam. Cic.
(*c*) Coniuravere urbem incendere. Sallust. What is the classical construction?
(*d*) Quod demiror. Cic.
(*e*) Dignus tuae virtutis. Balbus apud Cic.
(*f*) Procul dubio. Livy.
(*g*) Praefiscini dixerim. Plautus.
(*h*) Pollicebantur obsides dare. Caesar.
(*i*) Timeo ut eum sustineas. Cic.
(*k*) Liviam ad se deduci imperavit. Suet.
(*l*) Populabundus agros ad oppidum pervenit. Sisenna.
(*m*) Dixerunt omnia ex sententia processurum esse. Valerius Antias.
(*n*) Sole occaso. Claudius Quadr.
(*o*) Bellum Punicum posterior. Cassius Hem.

5. Give a short account of Sulla's constitutional reforms.

Explain why the question of juries and that of the enrolment of new citizens in particular tribes were of such great political importance.

6. Write not more than six or seven lines on each of the following:—

M. Livius Drusus, M. Antonius, Cornelius Cinna, Scipio Africanus the Younger, Cato Saturninus, Metellus Numidicus, Aemilius Scaurus.

7. State briefly the functions of the praetor, consul, dictator, quaestor: distinguish between a lex and a plebiscitum; also between the populus and plebs.

GEOMETRY.

THURSDAY, SEPTEMBER 11TH:—AFTERNOON, 2 TO 5.

(Write the answers in separate books marked A and B respectively).

A.

1. Find the centre of mean position of n given points.

2. Draw a right line parallel to the base of a triangle so that it shall be equal to the difference of the lower segments.

3. If a line AB be divided in C so that AB. BC $=$ AC^2 prove that AB^2 + BC^2 $=$ 3 AC,^{2} and that (AB + BC)^2 $=$ 5 AC^2.

4. If two circles cut orthogonally, the extremities of any diameter of either are conjugate points with respect to the other. (Define conjugate points).

5. Find the *inverse* of a circle when the centre of inversion is anywhere.

6. If two triangles have lines joining corresponding vertices concurrent, the intersections of the corresponding sides are collinear.

B.

7. The perpendiculars drawn from the vertices of a triangle to the opposite sides are concurrent.

8. Describe a circle passing through a given point and touching two given straight lines.

9. In a straight line of indefinite length find a point such that the sum of its distances from two given points on the same side of the given line, shall be a minimum.

10. If a straight line be drawn to cut a given circle and to pass through a fixed point, it will be cut harmonically by the circle, the point and the polar of the point.

11. If two pencils have the same anharmonic ratio

on one ray common, then the intersection of their corresponding rays are collinear.

12. The Radical axis of three circles taken in pairs are concurrent.

GEOMETRY—ALGEBRA—TRIGONOMETRY.

THURSDAY, SEPTEMBER 11TH:—MORNING, 9 TO 12.

(Write the answers in separate books marked A and B respectively.)

A.

1. Inscribe a regular pentagon in a circle.

2. Prove that the greatest triangle which can be inscribed in a circle on a diameter as base is one-half of the inscribed square.

3. Equiangular parallelograms are to one another in the ratio compounded of the ratios of their sides.

4. If a quadrilateral be inscribed in a circle, the sum of the rectangles contained by the opposite sides is equal to the rectangle contained by the diagonals.

5. Solve the equations:—

(*a*) $\dfrac{x+2}{x+1} + \dfrac{x+1}{x+2} = \dfrac{13}{6}$

(*b*) $x^2 + xy = 45,\ y^2 + xy = 36$

(*c*) $\dfrac{3x-1}{2x-1} - \dfrac{4x-2}{3x-2} = \dfrac{1}{6}$

6. The side of a square is 110 inches long: find the length and breadth of a rectangle which shall have a perimeter 4 inches longer than that of the square and its area 4 square inches less than that of the square.

B.

7. Simplify

$$\frac{1}{x^2-(a+b)\,x+ab} + \frac{1}{x^2-(a+c)\,x+ac} + \frac{1}{x^2-(b+c)\,x+bc}$$

8. Multiply $1 + \sqrt{3} - \sqrt{2}$ by $\sqrt{6} - \sqrt{2}$.

Rationalize the denominator of

$$\frac{2\sqrt{3} + 3\sqrt{2}}{3\sqrt{3} - 2\sqrt{5}}$$

9. Prove the following relations

(*a*) $\sin(A - B) = \sin A \cos B - \cos A \sin B$.

(*b*) $\sin A - \sin B = 2 \cos \frac{A+B}{2} \sin \frac{A-B}{2}$

(*c*) $\cos 2A = 2\cos^2 A - 1$.

10. Prove in any triangle

$$\cos \frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}$$

$$\frac{a+b}{a-b} = \frac{\tan \frac{A+B}{2}}{\tan \frac{A-B}{2}}$$

$$\frac{a-b}{c} = \frac{\sin \frac{A-B}{2}}{\sin \frac{A+B}{2}}$$

11. Prove the following:

(1) $\log mn = \log m + \log n$

(2) $\log \frac{m}{n} = \log m - \log n$

(3) $\log m^n = n \log m$

12. In a triangle $a = 275$, $b = 290$, $c = 325$: find the angles A, B and C.

ALGEBRA—THEORY OF EQUATIONS.

TUESDAY, SEPTEMBER 16TH:—MORNING 9 TO 12.

(Write the answers in two separate books marked A *and* B *respectively).*

A.

1. If in $f(x)$ the value of x be made to vary by indefinitely small increments from one number a to a greater number b, prove that $f(x)$ passes at the same time through all values between $f(a)$ and $f(b)$.

2. Trace the values of the left hand side of the equation $x^3 - 19x + 30 = 0$ for all whole numbers between $+4$ and -6 and thus find the three roots of the equation.

3. Find all the roots of the equation $x^5 - 1 = 0$

4. The roots of the equation

$$x^3 - 15x^2 + 71x - 105 = 0$$

are in Arithmetical Progression. Find them.

5. Trace the function and find the maximum or minimum value of

$$f(x) = 2x^2 + x - 6.$$

6. Break up into partial fractions the fraction

$$\frac{x^2 - 2x + 1}{(x-1)(x+2)^2}$$

B.

7. Solve the equation

$$x^3 - \frac{22x}{3} + \frac{19x}{3} - 4 = 0,$$ given that two of the roots are the reciprocals of each other.

8. State and prove Sturm's theorem.

9. Determine the number of real roots of the equation $x^5 + 9x^4 - 6x^3 - 7x^2 + 6x + 1 = 0$. Prove your method.

10. Between any two consecutive roots of the equation $f(x) = 0$ there lies at least one root of the equation $f'(x) = 0$.

11. Find the sum of n terms of the Arithmetical progression

$$\frac{1}{1+x}, \quad \frac{1}{1-x^2}, \quad \frac{1}{1-x}.$$

12. Express 2745 in the scale whose radix is eleven.

ENGLISH LANGUAGE.

TRENCH: STUDY OF WORDS.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 4 TO 5.15.

1. Give five examples of poetry in words, and three of degeneration of meaning, and two of elevation of meaning.

2. Write on
   (*a*) The origin of language.
   (*b*) Danish influence.

3. Comment on the following words:—*alas, affiance, anchorite, bacon, Brougham, chanticleer, dosones, Drepanum, gamin,* the Greek *"holos," journal, muslin, Essex, Wednesday.*

ENGLISH LITERATURE AND COMPOSITION.

FRIDAY, SEPTEMBER 12TH:—MORNING, 9 TO 12.30.

(*Write the answers to A, B and C in separate books*).

A.—SPENSER: FAERIE QUEENE, BOOK I.

1. Narrate the part played in this book by Prince Arthur, and explain its allegorical significance.

2. Describe the fight with the dragon (Canto XI).

3. Explain the following:—flaggy, haggard, heben, esloyne, disple, ment, misdeeming, stowre, swound, dight, chearen, bowrs, aslake, bauldrick, bale, amate, elfin, francklin, fry, limbo, lin, incontinent.

B.—TENNYSON: SELECTIONS.

1. Select any one of the longer poems studied, analyze it, and point out those qualities which you think most characteristic of the author.

2. Explain each of the following, and refer each to its poem and context.

(*a*) Yet hold me not for ever in thine East.

(*b*) Clothed in white samite, mystic, wonderful.

(*c*) From Mizpeh's tower'd gate with welcome light.

(*d*) But, propt on beds of amaranth and moly.

(*e*) She knows not what the curse may be.

3. Quote any twelve consecutive lines from one of the poems studied, *or* write on Tennyson's treatment of old stories.

C.—ENGLISH COMPOSITION.

Write an essay of not less than three pages on any *one* of the following subjects:—

(*a*) A Great Mediæval Churchman.

(*b*) The Composite Nature of Spenser's Allegories.

(*c*) The Character of Tennyson's Dora.

Church—"THE BEGINNING OF THE MIDDLE AGES.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 4.

1. Describe in detail the history of the Gothic race.

2. Sketch the history of the Church during the period of the German Inroads.

3. Give some account of the Eastern Empire, 476-800.

4. Describe the disruption of the Carolingian Empire.

5. Make notes on the following subjects: the establishment of the Lombard Kingdom; Austrasia and Neustria; the deposition of Childeric III; Edgar, the Peaceful; the Battle of the Lechfeld.

FRENCH.

MONDAY, SEPTEMBER 15TH:—MORNING, 9 TO 12.

N.B.—Candidates will write on one subject in each division of the following questions.

1. "JACK."

(*a*) "Les Ratés."

La séance littéraire au gymnase Moronval.

(de 150 à 200 mots).

(*b*) Le départ de la machine à vapeur pour Saint-Nazaire.

La fuite et la mort du petit roi Mâdou.
La vie de Daudet.
(de 100 à 150 mots).

2. "EUGÉNIE GRANDET."
(*a*) La mort de Grandet.
Le retour et le mariage de Charles.
(de 100 à 150 mots).
(*b*) La probité des commerçants français.
La *Comédie humaine*, une comédie de mœurs.
L'imagination et la puissance d'observation de Balzac.
(de 100 à 150 mots).

3. "PAGES CHOISIES DE MICHELET."
Michelet, historien romantique.
Raconter deux épisodes tirés des *Pages Choisies*.
(de 100 à 200 mots).

4. Traduire en français :

In honour of our last day in school he had put on his Sunday clothes, and now I knew why those old fellows had come and seated themselves at the far end of the room. Their presence seemed to say that they regretted not having been regular in attendance when they were boys. It was also a way of thanking our old master for his forty years of faithful service and showing their attachment to the province which so soon would belong to the foreigner.

GERMAN.

MONDAY, SEPT. 15TH :—AFTERNOON, 2 TO 5.

1. Translate into English (*at sight*) :—

Wallenſtein, Es gibt im Menſchenleben Augenblicke,
Wo er dem Weltgeiſt näher iſt als ſonſt,
Und eine Frage frei hat an das Schickſal.
Solch ein Moment war's, als ich in der Nacht,
Die vor der Lützner Aktion vorherging,
Gedankenvoll an einen Baum gelehnt,
Hinaus ſah in die Ebene. Die Feuer
Des Lagers brannten düſter durch den Nebel,
Der Waffen dumpfes Rauſchen unterbrach,
Der Runden Ruf einförmig nur die Stille.

Mein ganzes Leben ging, vergangenes
Und künftiges, in diesem Augenblick
An meinem inneren Gesicht vorüber,
Und an des nächsten Morgens Schicksal knüpfte
Der ahnungsvolle Geist die fernste Zukunft.

2. Translate into German (*at sight*) :—

One evening Mr. Derrick was taking a walk through the Strand. As the Strand in London is a place where many people walk in the evening, it is a good place for pickpockets. It happened on that evening that this gentleman felt a boy's hand in his pocket. He was quick enough to seize the boy by the arm. He led the boy along, intending to hand him over to the police. But the boy begged piteously for mercy, saying: "O sir, this is my first offence, and I will gladly return your property. Here is your purse, and of these five handkerchiefs you may take whichever you like best."

3. Translate into English :—

(*a*) Gut und von edlem Charakter ist er, davon habe ich Beweise, und Grillen und Vorurteile lassen sich bekämpfen. Es müßte schlimm zugehen, wollte ich ihn nicht bekehren, wenn ich mich klug und fest benehme. Sollte mir die Gabe, zu gefallen, ganz versagt sein? Ich will es nicht hoffen! Still, es regt sich im Nebenzimmer. Nun denn, Herr Professor, Sie lieben die Ruhe und Ungestörtheit; machen Sie sich darauf gefaßt, daß Ihre Ruhe etwas mehr gestört werden wird. Wir wollen sehen, ob Ihre bezopften Vorurteile Recht behalten oder Ihre junge Frau.

(*b*) Amos war gerade acht Jahre alt, als der gräfliche Hofmaler den Auftrag erhielt, die vier Ecken der inneren Kirchenkuppel mit je zwei schwebenden Engeln al fresco zu schmücken. Er wußte kein besseres Modell als den wunderschönen Schneiderknaben und malte ihn solchergestalt achtmal schwebend an die Kirchendecke. Mit leuchtendem Auge sah seitdem der Kleine allsonntäglich nach der Decke, wo er so lustig umherflatterte, und erzählte jedem Fremden mit Stolz, daß er schon einmal als Engel gesessen habe.

(*c*) Jetzt weiß ich nichts mehr. Ausgeleert hab' ich
Der Worte Köcher und erschöpft der Bitten Kraft.

Im Grabe ruht, der euch gewaltsam bändigte,
Und machtlos steht die Mutter zwischen euch.
Vollendet! Ihr habt freie Macht! Gehorcht
Dem Dämon, der euch sinnlos wütend treibt,
Ehrt nicht des Hausgotts heiligen Altar,
Laßt diese Halle selbst, die euch geboren,
Den Schauplatz werden eures Wechselmords.

4. *Die Braut von Messina* regarded as a fore-runner of the *Schicksalstragödien.*

or The substance of Schiller's *Über den Gebrauch des Chors in der Tragödie.*

or Other works (Greek, French, German), which have the same subject as *Die Braut von Messina.*

5. The friendly assistance of various kinds given to Schiller.

6. Show where the plain prose order of words would differ from the poetic in question 1.

SCHOLARSHIPS.

FACULTY OF ARTS

SCHOLARSHIPS.

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SCHOLARSHIPS.

ANALYTIC GEOMETRY—(*First Paper*).

WEDNESDAY, SEPTEMBER 10TH:—MORNING, 9 TO 12.

1. Show that if the equation of conic

$$ax^2 + 2hxy + ay^2 = 1$$

e transformed to its axes, it becomes

$$(a - h)\, x^2 + (a + h)\, y^2 = 1$$

2. Prove that the perpendicular from any point $x^1\ y^1$ n the tangent to an ellipse is

$$\sqrt{(a^2\cos^2\alpha + b^2\sin^2\alpha)} - x^1\cos\alpha - y^1\sin\alpha$$

here α is the angle made with the axis by the perpen- icular.

(*a*) If the perpendicular be drawn from the focus rove that the locus of the point where it meets the ngent is a circle on the major axis of the ellipse as ameter.

3. The triangle formed by joining the extremities of onjugate diameters of an hyperbola has a constant ea.

4. The rectangle under the segments of a focal chord an ellipse is to the whole chord in a constant ratio.

5. Find the length of the perpendicular from the ntre of an ellipse on the tangent at any point.

6. Taking the equation of a parabola referred to rec- ngular axes, $y^2 = 4mx$; transform it to oblique axes, ne a tangent and the other the diameter at any point the curve; show the equation will be of the same rm and that the new parameter is four times the dis- nce of the extremity of the diameter from the focus.

7. Find the equation of the polar of a point outside e circle $x^2 + y^2 = r^2$. Prove that the rectangle under e distances of the point and its polar from the centre constant.

8. Find the centre of mean position of any number given points.

9. Through a given point A, draw a straight line to eet a given straight line in Q, on AQ take a point P ch that $AP.\ AQ = \text{const}$, find by polar co-ordinates e locus of P.

10. Given the vertical angle and area of a triangle, prove that the locus of the point where the base is cut in a given ratio is an hyperbola.

11. Show by transformation to polar co-ordinates that the general equation of a right line

$$Ax + By + C = 0$$

can be put in the form

$$\rho \cos(\theta - a) = p$$

finding the values of a and p in terms of A, B and C.

12. Find the equations of the perpendiculars at the middle points of the triangle whose vertices are 0, 0; 0, 3; 4, 0, and show that the perpendiculars are concurrent.

ANALYTIC GEOMETRY—(*Second Paper.*)

THURSDAY, SEPTEMBER 11TH:—MORNING, 9 TO 12.

1. Prove that the equation of the conic passing through the four points

$$(1, 2); (3, 5); (-1, 4); (-3, -1)$$

is of the form

$$(3x - 2y + 1)(5x - 2y + 13) = K(x - 4y + 17)(3x - 4y + 5)$$

and determine K so that the conic shall pass also through the point $(-4, 3)$.

2. If $x^1\ y^1$ be a point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, prove that

$$\left(\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1\right) = \left(\frac{xx^1}{a^2} + \frac{yy^1}{b^2} - 1\right)\left\{A(x - x^1) + B(y - y^1)\right\}$$

is a conic which osculates the given ellipse at the point $x^1\ y^1$.

3. From equation of a conic in the form $\alpha\gamma = k\beta\delta$ prove that if any four fixed points on a conic be joined to a fifth variable point the anharmonic ratio of the pencil thus formed is constant.

4. Prove that

$$l^2\alpha^2 + m^2\beta^2 = n^2\gamma^2$$

is a conic with respect to which α, β, γ are the sides of a self-conjugate triangle.

(*a*) Show that the position of any point on it may be expressed by a single indeterminate ϕ, and that the equation of the chord joining any two points is

$$la \cos \tfrac{1}{2}(\phi+\phi') + m\beta \sin \tfrac{1}{2}(\phi+\phi') = n\gamma \cos \tfrac{1}{2}(\phi-\phi')$$

5. If $\alpha = 0$, $\beta = 0$, $\gamma = 0$ be the equation of the sides of a triangle, prove that the equation of the circumscribing circle is

$$\beta\gamma \sin A + \gamma\alpha \sin B + \alpha\beta \sin C = 0$$

6. Prove by trilinear co-ordinates that the three bisectors of the sides of a triangle meet in a point.

7. A homogeneous equation of the nth degree in x and y denotes n right lines passing through the origin.

8. Find the condition that the general equation of the second degree may represent two right lines.

9. Transform the equation of the curve

$$x^2 + 2xy - y^2 + 8x + 4y - 8 = 0$$

to the centre as origin.

10. Given any number of points, if a right line be such that the sum of the perpendiculars on it from the points, each multiplied by a given number is constant, the line will always touch a circle.

11. Two vertices of a given triangle move along fixed right lines; find the locus of the third.

12. Show that the trisection of a given angle may be effected by finding the points of intersection of a circle with an hyperbola.

CALCULUS.

MONDAY, SEPTEMBER 15TH :—MORNING, 9 TO 12.

1. Prove by integration that the volume of an oblate spheroid is $\frac{4}{3} \pi a^2 b$.

2. Prove that the volume of a sphere is to that of its circumscribing cylinder in the ratio 2 : 3.

3. Find the formula for the rectification of a curve in polar co-ordinate. Apply it to the Spiral of Archimedes, $r = a \theta$: and show that the length of any arc of the spiral measured from its pole is equal to that of a parabola measured from its vertex.—(Plot the spiral).

4. Prove that the area of an ellipse given by the general equation of the second degree :—

$$\frac{\pi (af^2 + bg^2 + ch^2 - 2 fgh - abc)}{(ab - h^2)^{\frac{3}{2}}}$$

5. If P be a point on an hyperbola, N the foot of the ordinate from the point, A the vertex, prove that the area A P N

$$= \frac{x y}{2} - \frac{ab}{2} \log \left(\frac{x}{a} + \frac{y}{b} \right)$$

6. Show that the $\int e^{mx} x^n dx$ can be made to depend on $\int e^{mx} dx$

7. Find $\int tan^{-n} \theta \, d\theta$

8. Find $\int \frac{(2x + 3) dx}{x^3 + 1x^2 - 2x}$

9. Find $\int \frac{dx}{(a + 2bx + cx^2)^{\frac{3}{2}}}$; $\int \frac{d\theta}{\sin \theta}$; $\int \frac{d\theta}{a + b \cos \theta}$

10. Find an expression for the radius of curvature of any curve and apply it to the parabola $x^2 = 4my$

11. Find the equation of the tangent at the point $x^1 y^1$ to any curve $y = f(x)$, and also to the curve $u = o$ where u is a function of x and y. Apply both forms to the ellipse.

12. Find a maximum or minimum value for $u = a \cos x + b \sin x$, where a and b are both positive.

13. Differentiate $\dfrac{x^{\frac{1}{2}} \tan x}{(e^x - 1)^{\frac{3}{2}}}$

14. Exp and $\sin^{-1} x$ by Maclaurin's Theorem.

15. Find $\dfrac{d^2y}{dx^2}$ when $y = \log (\sin x)$

16. Prove that the difference between the length of an infinitely small portion of any continuous curve and its chord is an infinitely small quantity of the third order.

HIGHER ALGEBRA.—THEORY OF EQUATIONS.—TRIGONOMETRY.

TUESDAY, SEPTEMBER 16TH:—MORNING 9 TO 12.

1. Find the sign of the element $a_3 b_4 c_2 d_5 e_1$ in the determinant of the fifth order; explaining the process by which it is found.

2. Find in the ordinary form the value of the determinant.

$$\begin{vmatrix} 1 & a & -b \\ -a & 1 & c \\ b & -c & 1 \end{vmatrix}$$

3. Show that the solution of the system of equations

$$a_1 x + b_1 y + c_1 z = m_1$$
$$a_2 x + b_2 y + c_2 z = m_2$$
$$a_3 x + b_3 y + c_3 z = m_3$$

may be written as

$$\Delta x = \begin{vmatrix} m_1 & b_1 & c_1 \\ m_2 & b_2 & c_2 \\ m_3 & b_3 & c_3 \end{vmatrix}$$ and two other forms.

Where Δ is the determinant $(a_1\ b_2\ c_3)$

4. Give Cardan's solution of the cubic equation. Explain the objection to this method.

5. Find the quadratic factors of

$$x^6 + 1 = 0$$

6. Find the multiple roots of the equation

$$x^4 - 2x^3 - 11x^2 + 12x + 36 = 0.$$

7. Any number which renders positive the polynomial $f(x)$ and all its derived $f_1(x)$, $f_2(x)$..... $f_n(x)$ is a superior limit of the positive roots of the equation $f(x) = 0$.

8. Prove $\theta = \tan\theta - \frac{1}{3}\tan^3\theta + \frac{1}{5}\tan^5\theta - a$

9. Prove that the perpendiculars of a spherical triangle meet in a point.

10. The solid angle subtended at any point by an infinite plane is 2π

11. State Napier's rules of Circular parts for right angled spherical triangles.

(*a*) If C be the right angle find *a*, given $A = 74° 15', B = 32° 10'$.

12. In a spherical triangle find *a*, given
$A = 68° 30', B = 74° 20', C = 83° 10'$.

LOGIC.

FRIDAY, SEPTEMBER 12TH:—MORNING, 9 TO 12.

1. Express your opinion as to the relation of Logic to (1) Philosophy and to (2) the Sciences of Nature.

2. Write a short essay on the nature, significance and limits of Definition.

3. What is your opinion as to the value of the statement that: intension and extension are in an inverse ratio to each other

4. Give *every possible converse* of the following propositions.

(*a*) Two straight lines cannot enclose a space.
(*b*) All trade-winds depend on heat.
(*c*) Some students do not fail in anything.

5. (*a*) Prove that the minor premise in the third figure must be affirmative, and the conclusion particular.
(*b*) In what figure can there be no weakened mood, and why?

6. Explain the difference between the Aristotelian and Goclenian Sorites, and show that a valid Sorites with n premises must have $n+1$ terms, and be capable of giving $\frac{n(n-1}{2}$ conclusions.

7. (*a*) Give an example of a simple constructive and simple destructive dilemma.

(*b*) Examine the following:—

Knowledge is of no use to any one in preventing him from committing crimes; for we hear every day of fraud and forgeries which never would have been committed had the person not learned to read and write.

If light is not reflected near the surface of the moon there cannot be any twilight; but if the moon has no atmosphere light is not refracted near its surface; therefore, if the moon has no atmosphere there cannot be any twilight.

8. What is the meaning of scientific method?

Contrast the empirical and deductive methods as developed by Jevons.

9. What is the value of the Method of Difference, and what is its relation to the Method of Residues?

10. What is (*a*) Hypothesis, (*b*) Theory, (*c*) Explanation? In answering, give illustrations other than those contained in Jevons.

11. What is the aim of rational classification?

CHEMISTRY. (*First Paper*).

MONDAY, SEPTEMBER 15TH:—MORNING, 9 TO 12.

1. What are the reasons for assuming that the molecules of carbon, silicon, and silica are very complex in structure?

2. Illustrate the statement that feeble bases have a strong tendency to form basic salts and feeble acids to form acid salts.

3. Give an account of the chemistry of chromium, of manganese, and of nickel.

4. What are the various methods by which the molecular weight of a compound may be determined?

5. Illustrate with reference to barium, lead and iron the statement that the higher oxides of the metals are neutral or acidic in properties.

6. Give an outline of the cycle of changes which the compounds of carbon, nitrogen and phosphorus undergo in passing from the mineral world through the vegetable and animal kingdoms back to the mineral world.

7. Give a short account of boron and its compounds.

CHEMISTRY. (*Second Paper.*)

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 5.

Write an historical account of the periodic law.

GREEK AUTHORS.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 9 TO 12.

Translate, with notes on words and phrases underlined:—

A.—SOPHOCLES, ANTIGONE.

(1) κουφονόων τε φῦλον ὀρνίθων ἀμφιβαλὼν ἄγει
καὶ θηρῶν ἀγρίων ἔθνη πόντου τ' εἰναλίαν φύσιν
σπείραισι δικτυοκλώστοις,
περιφραδὴς ἀνήρ·
κρατεῖ δὲ μηχαναῖς ἀγραύλου
θηρὸς ὀρεσσιβάτα, λασιαύχενά θ'
ἵππον ὀχμάζεται ἀμφὶ λόφον ζυγῶν,
οὔρειόν τ' ἀκμῆτα ταῦρον.

(2) σοῦ δ' οὖν πέφυκα πάντα προσκοπεῖν ὅσα
λέγει τις ἢ πράσσει τις ἢ ψέγειν ἔχει.
τὸ γὰρ σὸν ὄμμα δεινὸν ἀνδρὶ δημότῃ
λόγοις τοιούτοις οἷς σὺ μὴ τέρψει κλύων·
ἐμοὶ δ' ἀκούειν ἔσθ' ὑπὸ σκότου τάδε,
τὴν παῖδα ταύτην οἳ ὀδύρεται πόλις,
πασῶν γυναικῶν ὡς ἀναξιωτάτη
κάκιστ' ἀπ' ἔργων εὐκλεεστάτων φθίνει·
ἥτις τὸν αὑτῆς αὐτάδελφον ἐν φοναῖς
πεπτῶτ' ἄθαπτον μήθ' ὑπ' ὠμηστῶν κυνῶν
εἴασ' ὀλέσθαι μήθ' ὑπ' οἰωνῶν τινός·
οὐχ ἥδε χρυσῆς ἀξία τιμῆς λαχεῖν;
τοιάδ' ἐρεμνὴ σῖγ' ἐπέρχεται φάτις.

(3) ἔτλα καὶ Δανάας οὐράνιον φῶς
ἀλλάξαι δέμας ἐν χαλκοδέτοις αὐλαῖς·
κρυπτομένα δ' ἐν τυμβήρει θαλάμῳ κατεζεύχθη·
καίτοι καὶ γενεᾷ τίμιος, ὦ παῖ παῖ,
καὶ Ζηνὸς ταμιεύεσκε γονὰς χρυσορύτους.
ἀλλ' ἁ μοιριδία τις δύνασις δεινά·
οὔτ' ἄν νιν ὄλβος οὔτ' Ἄρης, οὐ πύργος, οὐχ ἁλί-
κτυποι
κελαιναὶ ναῦες ἐκφύγοιεν.

(4) καὶ τὸν μέν, αἰτήσαντες ἐνοδίαν θεὸν
Πλούτωνά τ' ὀργὰς εὐμενεῖς κατασχεθεῖν,
λούσαντες ἁγνὸν λουτρόν, ἐν νεοσπάσιν
θαλλοῖς ὃ δὴ 'λέλειπτο συγκατῄθομεν,
καὶ τύμβον ὀρθόκρανον οἰκείας χθονὸς
χώσαντες, αὖθις πρὸς λιθόστρωτον κόρης
νυμφεῖον Ἄιδου κοῖλον εἰσεβαίνομεν.

B.—Thucydides, VI.

(1) ὥστε τί ἂν λέγοντες εἰκὸς ἢ αὐτοὶ ἀποκνοῖμεν ἢ πρὸς τοὺς ἐκεῖ ξυμμάχους σκηπτόμενοι μὴ βοηθοῖμεν; οἷς χρεών, ἐπειδή γε καὶ ξυνωμόσαμεν, ἐπαμύνειν, καὶ μὴ ἀντιτιθέναι ὅτι οὐδὲ ἐκεῖνοι ἡμῖν. οὐ γὰρ ἵνα δεῦρο ἀντιβοηθῶσι προσεθέμεθα αὐτούς, ἀλλ' ἵνα τοῖς ἐκεῖ ἐχθροῖς ἡμῶν λυπηροὶ ὄντες δεῦρο κωλύωσιν αὐτοὺς ἐπιέναι.

(2) εἴρητο δὲ προειπεῖν αὐτῷ ἀπολογησομένῳ ἀκολουθεῖν, ξυλλαμβάνειν δὲ μή, θεραπεύοντες τό τε πρὸς τοὺς ἐν τῇ Σικελίᾳ στρατιώτας τε σφετέρους καὶ πολεμίους μὴ θορυβεῖν καὶ οὐχ ἥκιστα τοὺς Μαντινέας καὶ Ἀργείους βουλόμενοι παραμεῖναι, δι' ἐκείνου νομίζοντες πεισθῆναι σφίσι ξυστρατεύειν.

(3) τὰ μὲν γὰρ ἐκεῖ καὶ αὐτοὶ ἀρκοῦμεν πρὸς τοὺς πολεμίους, καὶ ὁ Χαλκιδεύς, ὃν ἀλόγως ἡμᾶς φησι δουλωσαμένους τοὺς ἐνθάδε ἐλευθεροῦν, ξύμφορος ἡμῖν ἀπαράσκευος ὢν καὶ χρήματα μόνον φέρων, τὰ δὲ ἐνθάδε καὶ Λεοντῖνοι καὶ οἱ ἄλλοι φίλοι ὅτι μάλιστα αὐτονομούμενοι. ἀνδρὶ δὲ τυράννῳ ἢ πόλει ἀρχὴν ἐχούσῃ οὐδὲν ἄλογον ὅ τι ξυμφέρον οὐδ' οἰκεῖον ὅ τι μὴ πιστόν· πρὸς ἕκαστα δὲ δεῖ ἢ ἐχθρὸν ἢ φίλον μετὰ καιροῦ γίγνεσθαι. καὶ ἡμᾶς τοῦτο ὠφελεῖ ἐνθάδε, οὐκ ἢν τοὺς φίλους κακώσωμεν, ἀλλ' ἢν οἱ ἐχθροὶ διὰ τὴν τῶν φίλων ῥώμην ἀδύνατοι ὦσιν.

(4) οἱ δ', ἐπειδὴ τὸ πρὸς τὸν κρημνὸν αὐτοῖς ἐξείργαστο, ἐπιχειροῦσιν αὖθις τῷ τῶν Συρακοσίων σταυρώματι καὶ τάφρῳ, τὰς μὲν ναῦς κελεύσαντες περιπλεῦσαι ἐκ τῆς Θάψου ἐς τὸν μέγαν λιμένα τὸν τῶν Συρακοσίων, αὐτοὶ δὲ περὶ ὄρθρον καταβάντες ἀπὸ τῶν Ἐπιπολῶν ἐς τὸ ὁμαλὸν καὶ διὰ τοῦ ἕλους, ᾗ πηλῶδες ἦν καὶ στεριφώτατον, θύρας καὶ ξύλα πλατέα ἐπιθέντες καὶ ἐπ' αὐτῶν διαβαδίσαντες, αἱροῦσιν ἅμα ἕῳ τό τε σταύρωμα πλὴν ὀλίγου καὶ τὴν τάφρον, καὶ ὕστερον καὶ τὸ ὑπολειφθὲν εἶλον.

Which counterwork was this? Indicate position on a sketch-map.

C.—Plato, Selections.

(1) τέως μὲν οὖν παρέθει ἐν τῇ νηΐ ἀντεχόμενος τοῦ δόρατος· ἐπεὶ δὲ δὴ παρημείβετο ἡ ναῦς τὴν ναῦν καὶ ἐπέσπα αὐτὸν τοῦ δόρατος ἐχόμενον, ἠφίει τὸ δόρυ διὰ τῆς χειρός, ἕως ἄκρου τοῦ | στύρακος ἀντελάβετο. ἦν δὲ γέλως καὶ κρότος ὑπὸ τῶν ἐκ τῆς ὁλκάδος ἐπί τε τῷ σχήματι αὐτοῦ, καὶ ἐπειδὴ βαλόντος τινὸς λίθῳ παρὰ τοὺς πόδας αὐτοῦ ἐπὶ τὸ κατάστρωμα ἀφίεται τοῦ δόρατος, τότ' ἤδη καὶ οἱ ἐκ τῆς τριήρους οὐκέτι οἷοί τ' ἦσαν τὸν γέλωτα κατέχειν, ὁρῶντες αἰωρούμενον ἐκ τῆς ὁλκάδος τὸ δορυδρέπανον ἐκεῖνο.

(2) ἦ πρὸς μὲν ἄρα σοι τὸν πατέρα οὐκ ἐξ ἴσου ἦν τὸ δίκαιον καὶ πρὸς τὸν δεσπότην, εἴ σοι ὢν ἐτύγχανεν, ὥστε, ἅπερ πάσχοις, ταῦτα καὶ ἀντιποιεῖν, οὔτε κακῶς ἀκούοντα ἀντιλέγειν οὔτε τυπτόμενον | ἀντιτύπτειν οὔτε ἄλλα τοιαῦτα πολλά· πρὸς δὲ τὴν πατρίδα ἄρα καὶ τοὺς νόμους ἐξέσται σοι, ὥστε, ἐάν σε ἐπιχειρῶμεν ἡμεῖς ἀπολλύναι δίκαιον ἡγούμενοι εἶναι, καὶ σὺ δὲ ἡμᾶς τοὺς νόμους καὶ τὴν πατρίδα καθ' ὅσον δύνασαι ἐπιχειρήσεις ἀνταπολλύναι, καὶ φήσεις ταῦτα ποιῶν δίκαια πράττειν, ὁ τῇ ἀληθείᾳ τῆς ἀρετῆς ἐπιμελόμενος.

(3) καὶ ἐν ᾧ ἂν ζῶμεν, οὕτως, ὡς ἔοικεν, ἐγγυτάτω ἐσόμεθα τοῦ εἰδέναι, ἐὰν ὅ τι μάλιστα μηδὲν ὁμιλῶμεν τῷ σώματι μηδὲ κοινωνῶμεν, ὅ τι μὴ πᾶσα ἀνάγκη, μηδὲ ἀναπιμπλώμεθα τῆς τούτου φύσεως, ἀλλὰ καθαρεύωμεν ἀπ' αὐτοῦ, ἕως ἂν ὁ θεὸς αὐτὸς ἀπολύσῃ ἡμᾶς. καὶ οὕτω μὲν καθαροὶ ἀπαλλαττόμενοι τῆς τοῦ σώματος ἀφροσύνης, ὡς τὸ εἰκός, μετὰ τοιούτων τε ἐσόμεθα καὶ γνωσόμεθα δι' ἡμῶν αὐτῶν πᾶν τὸ εἰλικρινές· τοῦτο δ' ἐστὶν ἴσως | τὸ ἀληθές. μὴ καθαρῷ γὰρ καθαροῦ ἐφάπτεσθαι μὴ οὐ θεμιτὸν ᾖ.

(4) ἀλλ' οὐκ αὐλητής; πολύ γε θαυμασιώτερος ἐκείνου· ὁ μέν | γε δι' ὀργάνων ἐκήλει τοὺς ἀνθρώπους τῇ ἀπὸ τοῦ στόματος δυνάμει, καὶ ἔτι νυνὶ ὃς ἂν τὰ ἐκείνου αὐλῇ. ἃ γὰρ Ὄλυμπος ηὔλει, Μαρσύου λέγω τούτου διδάξαντος. τὰ οὖν ἐκείνου ἐάν τε ἀγαθὸς αὐλητὴς αὐλῇ ἐάν τε φαύλη αὐλητρίς, μόνα κατέχεσθαι ποιεῖ καὶ δηλοῖ τοὺς τῶν θεῶν τε καὶ τελετῶν δεομένους διὰ τὸ θεῖα εἶναι. σὺ δ' ἐκείνου τοσοῦτον μόνον διαφέρεις, ὅτι ἄνευ ὀργάνων ψιλοῖς λόγοις ταὐτὸν τοῦτο ποιεῖς·

GREEK PROSE COMPOSITION AND TRANSLATION AT SIGHT.

WEDNESDAY, SEPTEMBER 17TH:— AFTERNOON, 2 TO 5.

1. Translate into Greek:—

When Poelos was defending a small fort named Maphekingon against the Agroikoi, having too few men to resist attacks on all sides, he hit upon the following plan: He called together the people and announced that no one was to go even at a walk across certain pieces of ground; for, as there were numerous hidden dangers, they would certainly be instantly destroyed. This news, as he expected, was conveyed to the enemy by deserters, with the result that they did not attempt the fortifications at the very points where they could probably have forced their way in. In this way Poelos was able to hold out till relief arrived, as the Agroikoi were naturally afraid of being killed and never suspected that they were being deceived.

2. Translate into English:—

(*a*) πρὸς μὲν οὖν τὸ ἐμπειρότερον αὐτῶν τὸ τολμηρότερον ἀντιτάξασθε, πρὸς δὲ τὸ διὰ τὴν ἧσσαν δεδιέναι τὸ ἀπαράσκευοι τότε τυχεῖν. περιγίγνεται δὲ ὑμῖν πλῆθός τε νεῶν. καὶ πρὸς τῇ γῇ οἰκείᾳ οὔσῃ, ὁπλιτῶν παρόντων, ναυμαχεῖν· τὰ δὲ πολλὰ τῶν πλειόνων καὶ ἄμεινον παρεσκευασμένων τὸ κράτος ἐστιν. ὥστε οὐδὲ καθ' ἓν εὑρίσκομεν εἰκότως ἂν ἡμᾶς σφαλλομένους. καὶ ὅσα ἡμάρτομεν πρότερον, νῦν αὐτὰ ταῦτα προσγενόμενα διδασκαλίαν παρέξει. θαρσοῦντες οὖν καὶ κυβερνῆται καὶ ναῦται τὸ καθ' ἑαυτὸν ἕκαστος ἕπεσθε, χώραν μὴ προλείποντες, ᾗ ἄν τις προσταχθῇ.

(*b*) ὦ τλῆμον, οἵους διαφυγὼν ἦλθες πόνους,
οὐδ' οἶσθα νόστον οἵκαδ', εἶτ' αὐτοῦ μενεῖς·
ἔρις γὰρ ἐν θεοῖς σύλλογός τε σοῦ πέρι
ἔσται πάρεδρος Ζηνὶ τῷδ' ἐν ἤματι.
Ἥρα μὲν, ἥ σοι δυσμενὴς πάροιθεν ἦν,
νῦν ἐστιν εὔνους, κεἰς πάτραν σῶσαι θέλει
ξὺν τῇδ', ἵν' Ἕλλας τοὺς Ἀλεξάνδρου γάμους,
δώρημα Κύπριδος, ψευδονυμφεύτους μάθῃ·
Κύπρις δὲ νόστον σὸν διαφθεῖραι θέλει,
ὡς μήτ' ἐλεγχθῇ μηδὲ πριαμένη φανῇ
τὸ κάλλος Ἑλένης οὕνεκ' ἀνονήτοις γάμοις.

LATIN AUTHORS.

WEDNESDAY, SEPTEMBER 10TH:—MORNING, 9 TO 12.

(*Write the answers to A and B in separate books.*)

A.—CICERO AND HORACE.

1. Translate:—

(*a*) Atque etiam clamitas, Laterensis, 'quousque ista dices? nihil in Cispio profecisti: obsoletae iam sunt preces tuae.' de Cispio mihi igitur obicies, quem ego de me bene meritum quia te teste cognoram, te eodem auctore defendi? et ei dices 'quousque' quem negas quod pro Cispio contenderim impetrare potuisse? nam istius verbi *quousque* haec poterat esse invidia: datus est tibi ille, condonatus est ille: non facis finem: ferre non possumus: ei quidem qui pro uno laborarit, id ipsum non obtinuerit, dici *quousque* irridentis magis est quam reprehendentis: nisi forte ego unus ita me gessi in iudiciis, ita et cum his et inter hos vixi, is in causis patronus, is in re publica civis et sum et semper fui, solus ut a te constituar qui nihil a iudicibus debeam unquam impetrare.

(*b*) Ut iugulent homines surgunt de nocte latrones;
ut te ipsum serves non expergisceris? atqui
si noles sanus curres hydropicus; et ni
posces ante diem librum cum lumine, si non
intendes animum studiis et rebus honestis
invidia vel amore vigil torquebere. nam cur
quae laedunt oculos festinas demere, si quid
est animum differs curandi tempus in annum?
dimidium facti qui coepit habet; sapere aude;
incipe. qui recte vivendi prorogat horam
rusticus exspectat dum defluat amnis; at ille
labitur et labetur in omne volubilis aevum.

2. Translate with an explanatory note where necessary:—

(a) At enim nimis ego magnum beneficium Plancii facio et, ut dicis, id verbis exaggero: quasi vero me tuo arbitratu et non meo gratum esse oporteat.

(b) Equidem, si quando, ut fit, iactor in turba, non illum accuso, qui est in summa sacra via, sum ego ad Fabium fornicem impellor, sed eum qui in me ipsum incurrit atque incidit.

(c) Nam si ita esset, quod patres apud maiores nostros tenere non potuerunt, ut reprehensores essent comitiorum, id haberent iudices, vel quod multo etiam minus esset ferendum: tum enim magistratum non gerebat is qui ceperat, si patres auctores non erant facti: nunc postulator a vobis ut eius exsilio qui creatus sit iudicium populi Romani reprehendatis.

(d) His levioribus comitiis diligentia et gratia petitorum honos paritur, non iis ornamentis quae esse in te videmus.

(e) Caerite cera, digni:

(f) Si pede maior erit subvertet, si minor uret.

(g) Ut cum pileolo soleas conviva tribulis.

(h) Qui melior servo qui liberior sit avarus non video.

(i) Ad imum Thrax erit aut olitoris aget mercede caballum.

B.—VIRGIL AND SALLUST.

1. Translate:—

(a) Proxima deinde tenent moesti loca, qui sibi letum insontes peperere manu, lucemque perosi proiecere animas. Quam vellent aethere in alto nunc et pauperiem et duros perferre labores! Fas obstat, tristique palus inamabilis unda alligat, et novies Styx interfusa coêrcet.

Nec procul hinc partem fusi monstrantur in omem, lugentes campi; sic illos nomine dicunt. Hic, quos durus amor crudeli tabe peredit, secreti celant calles, et myrtea circum silva tegit: curae non ipsa in morte relinquunt.

(b) Sed alia aliis licentia est, patres conscripti. Qui dimissi in obscuro vitam habent, si quid iracundia deliquere, pauci sciunt, fama atque fortuna eorum pares sunt; qui magno imperio praediti in excelso aetatem

agunt, eorum facta cuncti mortales novere. Ita in maxima fortuna minima licentia est; neque studere neque odisse sed minime irasci decet; quae apud alios iracundia dicitur, ea in imperio superbia atque crudelitas appellatur. Equidem ego sic existimo, patres conscripti, omnes cruciatus minores quam facinora illorum esse; sed plerique mortales postrema meminere, et in hominibus impiis, sceleris eorum obliti, de poena disserunt si ea paulo severior fuit.

2. Translate with explanatory notes:—

(a) Iam sebeunt *Triviae* lucos atque aurea tecta.

(b) Tot maria intravi duce te penitusque *repostas Massylum* gentes, praetentaque *Syrtibus* arva.

(c) Ipse atri velleris agnam
Aeneas *matri Eumenidum magnaeque sorori*
Ense ferit, *sterilemque* tibi, Proserpina, *vaccam.*

(d) Inde *alias* animas, quae per iuga longa sedebant,
Deturbat, laxatque foros: simul accipit alveo
Ingentem Aenean.

(e) Nomen et arma locum servant; te, amice, nequivi
Conspicere et patria decedens ponere terra.

Scan the lines of *(d)* and *(e)*.

(f) Ad hoc multi ex *coloniis* et *municipiis, domi* nobiles.

(g) Autronius et Sulla, *designati consules, legibus ambitus interrogati* poenas dederant.

(h) Est in carcere locus quod *Tullianum* appellatur, ubi paululum descenderis ad laevam, circiter duodecim pedes humi depressus. Eum muniunt undique parietes atque insuper camera lapideis fornicibus iuncta, sed incultu, tenebris, odore, foeda atque terribilis eius facies est.

LATIN PROSE COMPOSITION AND SIGHT TRANSLATION.

WEDNESDAY, SEPTEMBER 10TH:—AFTERNOON, 2 TO 5.

1. Translate into Latin:—

They say that Narcissus was exceeding fair and beautiful, but wonderful proud and disdainful; wherefore despising all others in respect of himself, he leads a solitary life in the woods and chases with a few followers to whom he alone was all in all; among the rest there follows him the nymph Echo. During this course of life it fatally so chanced that he came to a clear fountain,

upon the banks whereof he lay down to repose him in the heat of the day; and having espied the shadow of his own face in the water was so besotted and ravished with the admiration thereof, that he by no means could be drawn from beholding this image in this glass; in so much that by continually gazing there-upon he pined away to nothing, and was at last turned into a flower of his own name.

2. Translate into English:—

(Cato's review of Pompey's life and death).

"civis obit" inquit "multum maioribus inpar
nosse modum iuris, sed in hoc tamen utilis aevo,
cui non ulla fuit iusti reverentia. salva
libertate potens, et solus plebe parata
privatus servire sibi, rectorque senatus,
sed regnantis erat, nil belli iure poposcit,
quaeque dari voluit, voluit sibi posse negari.
immodicas possedit opes, sed plura retentis
intulit. invasit ferrum, sed ponere norat;
praetulit arma togae, sed pacem armatus amavit;
iuvit sumpta ducem, iuvit dimissa potestas,
casta domus luxuque carens corruptaque numquam
fortuna domini. clarum et venerabile nomen
gentibus, et multum nostrae quod proderat urbi.
olim vera fides Sulla Marioque receptis
libertatis obit; Pompeio rebus adempto
nunc et ficta perit. non iam regnare pudebit:
nec color imperii nec frons erit ulla senatus.
o felix cui summa dies fuit obvia victo
et cui quaerendos Pharium scelus obtulit enses!"
vocibus his maior quam si Romana sonarent
nostra ducis laudes, generosam venit ad umbram
mortis honos.

GREEK AND ROMAN HISTORY.

THURSDAY, SEPTEMBER 11TH:—MORNING, 9 TO 12.

A.—GREEK HISTORY.

1. When was the climax of Athenian power? Give a brief outline of the chief military events of the previous ten years.

2. Give a sketch of the position of the leading Greek States at the outbreak of the first Ionic Revolt.

3. What were the chief constitutional changes in Athens between 500 B. C. and 430 B. C.? Trace the effects of these on the national character.

4. What is meant by the terms Eisphora, Trierarchy?

5. Give a detailed account of the Athenian movement in Sicily up to the arrival of Gylippus. What had been the previous relations of Athens with the Sicilian States?

6. What do you know of Cylon, Dionysius, Meton, Tyrtaeus? Give dates.

B.—ROMAN HISTORY.

1. *(a)* Explain the form of the early government of Rome; *(b)* name the tribes or parts of the community; *(c)* describe the reform of Tarquinius Priscus.

2. What is the value of Livy's history of the regal period? Name other sources of information respecting the political and civil institutions of this early period.

3. What is a *plebiscitum?* Describe the first in Roman History.

4. Give leading events corresponding to the following dates: B. C. 494, 471, 336, 280, 250, 212, 197, 106, 71.

5. State the cause of the Third Samnite War, and give a brief account of this war.

6. Narrate the course of events in Sicily during the period 214-210 B. C.

ENGLISH LITERATURE.

A. SHAKSPERE:—TEMPEST.

FRIDAY, SEPTEMBER 12TH:—MORNING, 9 TO 12.

1. Write on Shakspere's use of magic as a dramatic motive.

2. What appears to you to be the moral significance of The Tempest.

3. Analyse the character of Caliban.

4. Explain the following, and state the connection in which each is used:—

(*a*) I find my zenith doth depend upon
A most auspicious star.

(*b*) All the charms
Of Sycorax, toads, beetles, bats, light on you!

(*c*) Misery acquaints a man with strange bed-fellows.

(*d*) We are such stuff
As dreams are made on; and our little life
Is rounded with a sleep.
The isle is full of noises,
Sounds and sweet airs, that give delight, and hurt not.

(*f*) A very ancient and fish-like smell: a kind of not of the newest Poor-John.

B. MILTON.—PARADISE LOST, BOOKS I. AND II.

5. Describe as fully as you can the council of the fallen angels.

6. What devices has Milton used to impress us with Satan's physical and intellectual force.

7. Explain the following:—"that pygmean race beyond the Indian mount," "the wealth of Ormus and of Ind," "Baalim and Ashtaroth," "the calf in Oreb," "serried shields," "in Ausonian land men called him Mulciber," "fierce Phlegeton," "wide Cerberean mouths," "the hoarse Trinacrian shore."

ENGLISH LITERATURE AND COMPOSITION.

FRIDAY, SEPTEMBER 12TH:—AFTERNOON, 2 TO 5.

A.—LAMB:—ESSAYS OF ELIA.

1. Indicate and illustrate the characteristics of Lamb's style.

2. Give a few of Lamb's comments on
(*a*) Thomas Tame.
(*b*) Matthew Field.
(*c*) Lending books to S. T. C.
(*d*) Sarah Battle and playing for chance.
(*e*) Sewel's history of the Quakers.
(*f*) Stackhouse.
(*g*) Artaxerxes (the play).
(*h*) Tea and Two Methodist Divines.
(*t*) Bensly, the actor.

3. Give an outline of the Essay "On the Artificial Comedy of the Last Century," and also of an Essay of your own choice, but one not drawn on in question 2.

B. COMPOSITION.

Write an essay on any *one* of the following subjects:—

(*a*) Milton's Familiarity with the Classics.
(*b*) The Characteristic Humour of Charles Lamb.
(*c*) Caliban.

Myers—"MEDIAEVAL AND MODERN EUROPE," PART I.

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 5.

1. Describe fully the conversion of England.

2. What do you know of Teutonic Legislation?

3. Write a detailed account of Chivalry.

4. Enumerate and comment upon the conquests of the Tartar tribes during the Middle Ages.

5. Give some account of: (*a*) the Lombard League; (*b*) the Rise and Greatness of Genoa.

6. Outline the main features of the Warfare between England and Scotland, 1285-1328.

7. What are the main events of Spanish history during the Middle Ages?

FRENCH.

MONDAY, SEPTEMBER 15TH:—MORNING, 9 TO 12.

1. Analyser le caractère de Tartuffe.

2. L'élément antique et l'élément moderne dans l'Iphigénie de Racine.

3. Les idées générales de Vigny dans "Servitude et Grandeur Militaire."

4. Résumer une des "Nuits" de Musset.

5. Donner une courte notice biographique de Molière, Racine, Vigny et Musset en indiquant l'époque à laquelle ils appartiennent.

GERMAN.

MONDAY, SEPTEMBER 15TH:—AFTERNOON, 2 TO 5.

1. Translate (at sight):

(*a*) Am 20. März 1890 mußte Fürst Bismarck den Platz räumen, den er sich selbst zugleich mit dem deutschen Kaisertum durch weltgeschichtliche Thaten geschaffen hatte. Er wurde aus seinen Ämtern entlassen.

Welche Bewegung die Entlassung des Fürsten im Volke selbst hervorrief, davon gab zunächst Berlin ein treues Bild. Am Vormittag des 26. März machte der Fürst im königlichen Schlosse dem Kaiser seinen Abschiedsbesuch, der etwa eine Stunde dauerte, und dann im Niederländischen Palais dem Großherzog und der Großherzogin von Baden. Als er von dort in die Wilhelmstraße zurückfuhr, begleitete eine tausendköpfige Menge seinen Wagen. Balkone und Fenster der Häuser hatten sich gefüllt. Überall stürmische Zurufe, Hüteschwenken und Tücherwehen ohne Ende. Dichte Scharen folgten dem Wagen bis zum Reichskanzlerpalais, das noch eine Stunde lang von einer gewaltigen Menge umlagert blieb. Auf dem ganzen Wege dankte der Fürst, den zahlreiche Blumenspenden in seinem Wagen umgaben, durch unaufhörliches Sichverneigen nach rechts und links, sichtlich tief ergriffen von diesen ganz unvorbereiteten, aus überquellendem Herzen mit unwiderstehlicher Gewalt hervorbrechenden Huldigungen.

Am Abend des 28. März weilte Fürst Bismarck im Mausoleum in Charlottenburg noch eine längere Zeit am Sarge Kaiser Wilhelms I.; er nahm den letzten Abschied von dem geliebten Herrn, dem er mit unerschütterlicher Treue bis zum Tode gedient hatte. Was mag in der Stunde das Herz des alten Kanzlers bewegt haben! Bei dem Abschied des folgenden Tages erreichte die Begeisterung der Berliner Bevölkerung für den Fürsten ihren Höhepunkt.

(*b*) Seht ihr den Sommer durch die Lüfte fliegen?
In Gold und Blau—so hab' ich mir's gedacht;
Nun ist er wieder auf die Welt gestiegen,
Nun giebt's ein Blühn und Duften Tag and Nacht.

Selbst auf den alten Festungswällen neigen
Sich grüne Kräuter jetzt dem Sommerhauch,
Auf allen Plätzen und in Gärten steigen
Springbrunnen aufwärts über Baum und Strauch.

Die Falter wissen sich schon nicht zu lassen
Und taumeln glücklich in ein Meer von Licht,
Und Kinderjubel schallt auf allen Gassen,
Und überall ein Kinderangesicht.

Die kleinen Mädchen klatschen in die Hände
Und krähn vergnüglich in die blühnde Welt,
Und in der Stadt sind auch die kahlsten Wände
Vom glühnden Glanz des Sonnenscheins erhellt.

Der arme Schuster selbst ließ seine Trauer
Und hämmert lustig auf den alten Schuh,
Und vor der Werkstatt tönt vom Vogelbauer
Des gelben Sängers heller Klang dazu.

In allen Lüften wirbeln Lerchenlieder,
Und Schwalben schießen durch die goldnen Höhn,
Und aus den Gärten duftet weißer Flieder
Herrgott im Himmel! Ist die Welt doch schön!

2. Translate:—

(*a*) Von Reineck, aus einem altadeligen Hause, tüchtig, rechtschaffen, aber starrsinnig, ein hagerer, schwarzbrauner Mann, den ich niemals lächeln gesehen. Ihm begegnete das Unglück, daß seine einzige Tochter durch einen Hausfreund entführt wurde. Er verfolgte seinen Schwiegersohn mit dem heftigsten Prozeß, und weil die Gerichte in ihrer Förmlichkeit seiner Rachsucht weder schnell noch stark genug willfahren wollten, überwarf er sich mit diesen, und es entstanden Händel aus Händeln, Prozesse aus Prozessen. Er zog sich ganz in sein Haus und einen daranstoßenden Garten zurück, lebte in einer weitläuftigen, aber traurigen Unterstube, in die seit vielen Jahren kein Pinsel eines Tünchers, vielleicht kaum der Kehrbesen

einer Magd gekommen war. Mich konnte er gar gern leiden, und hatte mir seinen jüngeren Sohn besonders empfohlen. Seine ältesten Freunde, die sich nach ihm zu richten wußten, seine Geschäftsleute, seine Sachverwalter sah er manchmal bei Tische, und unterließ dann niemals auch mich einzuladen. Man aß sehr gut bei ihm und trank noch besser. Den Gästen erregte jedoch ein großer, aus vielen Ritzen rauchender Ofen die ärgste Pein. Einer der Vertrautesten wagte einmal dies zu bemerken, indem er den Hausherrn fragte, ob er denn so eine Unbequemlichkeit den ganzen Winter aushalten könne?

(*b*) Leubelfing hatte den gestreckten Lauf seines Tieres nicht angehalten, dieses ermüdete von selbst am äußersten Lagerende. Da beruhigten sich auch die erregten Sinne des Reiters. Der Mond schien taghell und das Roß ging im Schritt. Bei klarerer Ueberlegung erkannte jetzt der Flüchtling im Dunkel jenes Ereignisses, das ihn von der Seite des Königs vertrieben hatte, mit den scharfen Augen die Liebe und des Hasses seinen Doppelgänger. Es war der Lauenburger. Hatte er nicht gesehen, wie der Gebrandmarkte die Faust gegen die Gerechtigkeit des Königs geballt hatte? Besaß der Gestrafte nicht den Scheinklang seiner Stimme? War er selbst nicht Weibes genug, um in jenem fürchterlichen Augenblicke die Kleinheit der geballten fürstlichen Faust bemerkt zu haben? Gewiß, der Lauenburger sann Rache, sann Mord gegen das geliebte Haupt. Und in dieser Stunde unheimlicher Verfolgung und Beschleichung seines Königs hatte sich Leubelfing aus der Nähe seines Königs verbannt. Eine unendliche Sorge für das Liebste, was er besessen, preßte ihm das Herz zusammen und löste sich bei dem Gedanken, daß er es nicht mehr besitze, in ein beklommenes Schluchzen und dann in unbändig stürzende Thränen.

3. Give the 1st pers. sing. imperf. and the past participle of einverleiben, vereinbaren, vorhaben, handhaben, veranlassen, frühstücken, vorübergehen, verabschieden.

4. What is in German the construction of verbs of choosing, appointing, declaring, considering? Treat each class separately in your answer and give examples.

5. Give the English equivalents of

Mit der Thüre in's Haus fallen.
Kein Blatt vor den Mund nehmen.
Ich ſtehe wie auf Kohlen.
Mir iſt nichts daran gelegen.
Er iſt ganz aus der Art geſchlagen.
Ich werde es ihm ſchon ſagen.
Ich will es darauf ankommen laſſen.
Das hat nichts zu ſagen.

6. Translate:—

(a) A certain king of Persia being angry with his grand vizier, dismissed him, and put another in his place. Nevertheless, he allowed the disgraced minister to choose any spot in the kingdom he might fancy to which to retire with his family. 'I have no need of all the benefits with which your kindness has overhelmed me; and, for the remainder of my life time, I should like to inhabit some deserted village. I should repeople it with my retainers, and should endeaver to restore it to happiness.

The king consented, and messengers went in search of such a village as the vizier had asked for; but they could not find one. When the king informed his former minister of this ill success,he received for answer: I was not unaware that in all the countries that I have administered,there was not one ruined place. What I wanted was that your majesty should know in what condition I hand over your dominions. I hope that some day my successor will render you the same account.' The vizier was reinstated.

(b) The army of Alexander the Great was once marching through a barren country. Water being very scarce, the Macedonians were wellnigh dying with thirst. A few soldiers, who had been sent in search of a well, came to a rock, in the hollow of which they found a little fresh water, which they brought to Alexander in a helmet. But in sight of all the soldiers the king took the helmet and threw the water on the ground. 'This water,' said he, addressing his warriors, 'anounces to us a well not far distant: bear your privations a little longer, and your patience will be rewarded.' At the sight of the abstinence of their heroic king, the Macedonians forgot their hardships. 'Lead us wherever you like,' they exclaimed; 'we are ready to follow you to the end of the world.'

ECONOMICS AND POLITICAL SCIENCE.

ELEMENTS OF POLITICAL SCIENCE.

WEDNESDAY, SEPTEMBER 17TH:—MORNING, 9 TO 12.

NOTE:—*In answering the following questions, candidates are expected to adhere closely to the material supplied by the texts prescribed for the examination.*

I. Discuss, after Wilson, the different theories of the origin of the state.

II. Reproduce Wilson's account of the nature and sources of Law, and compare it with the (Austinian) "analytical account of Law."

III. Write notes on: Law of Nature, Malum prohibitum, Bundesstaat, Kulturstaat, Laissez Faire.

IV. Sketch in outline Seeley's analysis of the term "Liberty," giving his classification of its different significations.

ECONOMICS AND POLITICAL SCIENCE.

THE CONSTITUTION AND GOVERNMENT OF ENGLAND.

WEDNESDAY, SEPTEMBER 17TH:— AFTERNOON, 2 TO 5.

NOTE:—*In answering the following questions, candidates are expected to adhere closely to the material supplied by the texts prescribed for the examination.*

I. Discuss, after Macy, the constitutional relation of the two houses of Parliament.

II. Accurately describe the relations of Church and State as at present existing in England.

III. Outline Macy's account of the operation of the cabinet system.

IV. Write notes on: the Royal Veto, the composition of the House of Lords, the Prerogative.

ECONOMICS AND POLITICAL SCIENCE.

POLITICAL ECONOMY.—(*First Paper.*)

TUESDAY, SEPTEMBER 16TH:—MORNING, 9 TO 12.

1. Into what departments is the study of Political

Economy usually divided? Give reasons for selecting these divisions.

2. To what principal causes can the superior efficiency of the laborers of one class or nation over those of another be attributed?

3. State carefully the nature and office of capital.

4. What qualities must be possessed by an object in order that it may have value? Which of these qualities has the more important influence on the amount of such value?

5. What are the chief functions of money? Discuss the relation of these functions to each other.

6. Examine the effect of seigniorage on the purchasing power of coin.

7"Rent forms no part of the price of agricultural produce." State briefly the argument by which this assertion is supported.

ECONOMICS AND POLITICAL SCIENCE.

POLITICAL ECONOMY.—(*Seoond Paper.*)

TUESDAY, SEPTEMBER 16TH:—AFTERNOON, 2 TO 5.

SIX *questions to be answered.*

1. For what great reasons do we find many different rates of interest, so-called, existing at one and the same time?

2. Distinguish between real and nominal wages, and give some reasons why wages differ in different places and employments.

3. Discuss the industrial effects of a failure of competition.

4. What is meant by over-production? Is a general over-production to be feared?

5. What are the leading benefits of co-operation to the wage-earning classes? Mention any difficulties of the system of which you may be aware.

6. What principle should govern the distribution of relief to the indigent poor, and why?

7. By what means does a country make payment for its imports, and on what other accounts may similar international payments become due?

8. By what tests could the fairness (or otherwise) of a system of taxation be judged?

EXHIBITION AND PRIZE
EXAMINATIONS

FACULTY OF APPLIED SCIENCE

EXHIBITION AND PRIZE EXAMINATIONS

SECOND YEAR EXHIBITION, 1902.

MATHEMATICS.

SATURDAY, SEPTEMBER 20TH:—MORNING, 9 TO 12.30.

1. Prove Euclid, Book VI., Prop. 3, by two independent methods.

2. Divide a straight line (internally and externally) into two parts, so that the rectangle contained by the parts may be equal to a given area.

3. Find the locus of the centre of a circle which touches two given unequal intersecting circles (*a*) both internally, (*b*) both externally, (*c*) one internally and the other externally.

4. From a given point without a given plane draw a normal to the plane.

5. A sphere is divided into three parts by two parallel planes which trisect a diameter. Compare the volume of the middle portion with that of one of the end portions.

6. In a parabola

(*a*) tangents from any external point subtend equal angles at the focus,

(*b*) and have the same ratio as the perpendiculars upon them from the focus.

(*c*) The normals at the extremities of a focal chord intersect on the diameter which bisects the chord.

7. The harmonic mean between two quantities is $\frac{4}{5}$ of the geometric, and the arithmetic is 5. Find the quantities.

8. If $\frac{c}{d}$ be $< \frac{a}{b}$ but $> \frac{e}{f}$ show that $\frac{a+c+e}{b+d+f}$ is $< \frac{a}{b}$ and $> \frac{e}{f}$.

9. Show that the co-efficient of x^r in the expansion of

$$(1+x)^{-\frac{10}{3}} = \frac{10 \cdot 13 \cdot 16 \cdot \ldots \cdot (3r+7)}{(-3)^r \lfloor r}$$

10. Solve

(1) $\left.\begin{aligned}(x+y)^2+3(x-y) &= 30\\ xy+3(x-y) &= 11\end{aligned}\right\}$

(2) $^{2x}C_3 = \frac{44}{3}\,{}^{x}C_2$

(3) $\begin{vmatrix} 5 & 0 & x \\ x & 4 & 3 \\ 2 & 2 & 2 \end{vmatrix} = 4$

(4) $\cos x - \cos 7x = \sin 4x.$

(5) $\sin^{-1} x + \cos^{-1} x = \sin^{-1}\frac{x}{2}$

11. Prove the following identity without expanding:—

$$\begin{vmatrix} 2 & 1 & -7 \\ -4 & -3 & 8 \\ 6 & 5 & -9 \end{vmatrix} = 2 \begin{vmatrix} 1 & 1 & 7 \\ 2 & 3 & 8 \\ 3 & 5 & 9 \end{vmatrix}$$

12. Show by De Moivre's Theorem that
$\cos 4\theta = \cos^4\theta - 6\cos^2\theta \sin^2\theta + \sin^4\theta$

13. Find the four fourth roots of unity.

14. Show that $\sqrt[5]{-\sqrt{3}+\sqrt{-1}} + \sqrt[5]{-\sqrt{3}-\sqrt{-1}} = 2^{\frac{1}{5}}\,3^{\frac{1}{2}}$

15. Prove that

(1) $1 + \tan^6\theta = \sec^4\theta(\sec^2\theta - 3\sin^2\theta)$

(2) $\sin 3\theta + \sin 5\theta = 8\sin\theta\cos^2\theta\cos 2\theta$

16. In any plane triangle

$$\frac{\cos A + \cos B + \cos C - 1}{\sin A + \sin B + \sin C} = \tan\frac{A}{2}\tan\frac{B}{2}\tan\frac{C}{2}$$

17. In any spherical triangle prove that

$$\sin\frac{a}{2} = \sqrt{\frac{\cos S\cos(S-A)}{\sin B\sin C}}$$

and show that the quantity under the radical is always positive.

THIRD AND FOURTH YEARS EXHIBITION AND PRIZE EXAMINATION, 1902.

MATHEMATICS.

SATURDAY, SEPTEMBER 20TH:—MORNING, 9 TO 12.30.

1. Find the asymptotes of the curve

$$y^2 (x-3) = (x-1)(2-x)^2.$$

2. The tangent at a point (x, y) on a curve makes an angle ϕ with the axis of x; show that

$$(d^2 x)^2 + (d^2 y)^2 = (d\phi\, ds)^2 + (d^2 s)^2.$$

3. The co-ordinates of the centre of curvature of the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ are

$$x + 3\sqrt[3]{xy^2},\ y + 3\sqrt[3]{x^2 y}.$$

4. Given the curve $y^2 = x^4 (1-x^2)$, show that:—

(1) The origin is a double cusp.

(2) The area $= \frac{1}{4}\pi$.

(3) The volume of the solid of revolution about the axis of $x = \frac{4}{35}\pi$.

(4) The moment of inertia of this solid with reference to the axis of $x = m.\ \frac{70}{1287}$

(5) The maximum ordinate $= \frac{2}{9}\sqrt{3}$.

(6) There are points of inflexion where $x = \pm\sqrt{\frac{9-\sqrt{33}}{12}}$.

5. Find the following integrals:—

(1) $\int \frac{d\theta}{1+\cos\theta}$,

(2) $\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} \cot^3\theta\, d\theta$,

(3) $\int_0^1 \frac{\sqrt{x}\, dx}{\sqrt{2-x^3}}$,

(4) $\int \frac{(1+x)\, dx}{x(1+x^2)}$

(5) $\int x^2 (\log x)^2 dx$,

(6) $\int \frac{x-2}{x\sqrt{x}}\, dx$.

6† Show that $^{\sin\theta} = 1 + x + \frac{x^2}{2} - \frac{x^4}{8} - \ldots$

7.* Find the equation of the circle which passes

through the origin and the points common to the circles

$$x^2 + y^2 - 2x - 4y - 20 = 0,$$
$$x^2 + y^2 - 14x - 16y + 100 = 0.$$

8.* The locus of the foot of the perpendicular drawn from the focus of a parabola to the tangent is the tangent at the vertex.

9.* Show that the line $y = x + \sqrt{\frac{5}{6}}$ touches the ellipse $2x^2 + 3y^2 = 1$.

10.† The sum of the squares of conjugate diameters of an ellipse is constant.

11.† Find the centre of the conic

$$2x^2 + 3xy - 2y^2 + x - 4y = 1.$$

12.* Find the velocity of projection in order that a bullet, shot horizontally, may travel round the earth.

13.* A spherical shot weighing 100 lbs., lies between two smooth planes inclined at 30° and 60°, respectively, to the horizon. Find the pressures on the planes.

14.† A rod is swinging about one end. The other end is suddenly fixed. Show that the jerks at the two ends are as 1 to 2.

15.† Describe the method of using a friction brake to determine the power developed by a machine.

* For Third Year only.
† For Fourth Year only.

SCOTT EXHIBITION EXAMINATION.

SUMMER READINGS IN ENGLISH.

MONDAY, SEPTEMBER 22ND:—AFTERNOON 2 TO 5.

Candidates are recommended to pay attention to the form, as well as the matter, of their answers. Composition and spelling will be taken into account along with knowledge of the books in determining the result.

Only two questions in each section are to be attempted — eight in all.

A.—SHAKSPERE'S HENRY V.

1. Discuss the character of Henry V. as the ideal Englishman.

2. Comment on the humour and pathos of Falstaff's death scene.

3. Describe the theatres and stage appliances of Shakspere's time.

B.—GOLDSMITH'S VICAR OF WAKEFIELD.

4. Write a short life of Goldsmith and give your opinion of his character.

5. Narrate the adventures of Moses at the fair.

6. In what way does the novel offend against your ideas of morality or probability?

C.—SCOTT'S WAVERLEY.

7. Indicate the position of the Waverly novels in Scott's literary career.

8. Contrast the characters of Rose Bradwardine and Flora MacIvor.

9. Show from the novel some of the excellences and defects of the Highland clan system.

D.—STEVENSON'S KIDNAPPED.

10. Comment on Alan Breck and David Balfour as types of Highland and Lowland character.

11. Describe the fight on the brig.

12. What is your opinion of Stevenson *(a)* as a story-teller; *(b)* as a writer?

SCOTT EXHIBITION EXAMINATION.

DESCRIPTIVE GEOMETRY.

MONDAY, SEPTEMBER 22ND:—MORNING, 9 TO 12.

1. A right circular cylinder, 2″ dia., stands on the H.P. with its axis vertical and 2″ from the V.P. A similar cylinder has its axis inclined at 40° to the H. P, parallel to the V. P., and 2⅛″ from the V.P. The elevations of the axes bisect each other 2″ above the X.Y. Show plan and elevation.

2. A right square prism 3″ long, edge of end 1½″, has one short edge in the V.P. at 40° to the H.P. and its long edge at 30° to the H.P. Show plan and elevation.

3. A right circular cone, 2″ dia. of base, height 3″, has one of its generators in the V.P., and its axis at 30° to the H.P. A section plane passes through the solid inclined at 60° to the V.P. and vertical and cuts the axis ½″ from the base. Show the true form, both cases.

4. A tetrahedron, edge 2½ in., has one edge at 25° to H.P. and 15° to V.P. and an edge adjacent to this at 40° to H.P. Show plan and elevation.

5. A square pyramid, edge of base 1½″, height 2½″, has one diagonal of base in the V. P., and the other diagonal is at 45° to the H.P. and 30° to the V.P. Show plan.

6. Show the path of a point moving with a circular disc whose dia. is 1″, the point is 1¾″ from the centre of the disc, and the disc rolls on the inside of a circle whose radius is 3½″.

BRITISH ASSOCIATION EXHIBITION AND PRIZE EXAMINATION.

THEORY OF STRUCTURES.

MONDAY, SEPTEMBER 22ND:—MORNING, 9 TO 12.

Candidates may answer all the questions.

1. What is meant by *resilience?* A bar 1¼ inches in sectional area and 12 feet long is subjected to a pull of 22,000 pounds. Calculate the work stored up in the bar. E = 31,000,000 (lbs. and inches).

2. A tension member of T. section has a flange 4 inches × ⅜ inch and a web of the same dimensions. It is subjected to a load of 20,000 pounds whose line of action is half an inch from the centre of gravity of the section on the flange side. Calculate the maximum and minimum stresses on the section.

3. Show that the angle of twist θ of a length (1) of shafting, under a given twisting moment T, is given by

$$\theta = \frac{10.2 \quad T \quad l}{G \quad d^4}$$

where C = modulus of rigidity.
d = diameter of the shaft.
θ = angle of twist expressed in circular measure.

4. Describe the method of sections for determining the stresses in the members of a framed bridge or roof.

Find the stress in each of the members of a Warren girder of 50 feet span made up of equilateral triangles, each 10 feet long, and loaded with 3,000 pounds on each top joint.

5. Obtain Gordon's Formula for the breaking load on a strut and point out to what extent it is an approximation.

6. State the conditions necessary for the stability of a plain joint in a masonry structure.

If R and r are the external and internal radii of a horizontal section of a round chimney, find the limiting positions of the centre of pressure at the sections in order that there may be no tension on the joint.

7. Show that any state of stress in two dimensions may be represented by an ellipse of stress.

A shaft of 10 inches in diameter transmits a twisting moment of 80 foot tons and also a bending moment of 40 foot tons. Find the maximum stress in the shaft.

8. A beam of uniform section, uniformly loaded, is supported at it's ends and at the centre, all the supports being on the same level. Find the reaction at each pier and draw the diagrams of bending moment and shearing force.

9. Find the thickness of an hydraulic press cylinder of cast steel to stand an internal pressure of 5,000 pounds per square inch, having given that the allowable stress on the metal is 16,000 pounds per square inch and the internal diameter of the cylinder 12 inches.

10. An iron shaft, 2¼ inches diameter, can safely transmit a twisting moment of 17,000 pound inches. Find what horse-power can be transmitted by a 4 inch shaft making 150 revolutions per minute.

SESSIONAL EXAMINATIONS.

FACULTY OF ARTS

1903

CLASSICAL LITERATURE AND HISTORY

FIRST YEAR.

GREEK AUTHORS.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

(Answers to A, B and C are to be shown up in separate books.)

A.—XENOPHON, THE STORY OF CYRUS.

Translate, with notes on words and phrases underlined:—

(1) καὶ τὰς ἀρχὰς οὗτοι πάσας αἱροῦνται· καὶ ἐάν τις ἢ ἐν ἐφήβοις ἢ ἐν τελείοις ἀνδράσιν ἐλλίπῃ τι τῶν νομίμων, φαίνουσι μὲν οἱ φύλαρχοι ἕκαστοι, οἱ δὲ γεραίτεροι ἀκούσαντες ἐκκρίνουσιν. ὁ δὲ ἐκκριθεὶς ἄτιμος διατελεῖ τὸν λοιπὸν βίον.

(2) καὶ τὸ μὲν πρῶτον οἱ παῖδες ἔσκωπτον αὐτόν, λέγοντες ὅτι ἡδυπαθεῖν ἐν Μήδοις μεμαθήκοι· ἐπεὶ δὲ αὐτὸν ἑώρων ὥσπερ καὶ αὐτοὶ καὶ ἐσθίοντα ἡδέως καὶ πίνοντα καὶ πολλὰ κρατιστεύοντα ἑαυτῶν, ἐνταῦθα δὴ πάλιν ὑπέπτησσον αὐτῷ οἱ ἥλικες.

(3) Ἐπεὶ δ' ἦλθον οἴκαδε, ἔλεγον τοῦ Κύρου ὁ μέν τις τὴν σοφίαν, ὁ δὲ τὴν καρτερίαν, ὁ δὲ τὴν πραότητα, ὁ δέ τις καὶ τὸ κάλλος καὶ τὸ μέγεθος. ἔνθα δὴ ὁ Τιγράνης ἐπήρετο τὴν γυναῖκα, Ἦ καὶ σοί, ἔφη, ὦ Ἀρμενία, καλὸς ἐδόκει ὁ Κῦρος εἶναι; Ἀλλὰ μὰ Δί', ἔφη, οὐκ ἐκεῖνον ἐθεώμην. Ἀλλὰ τίνα μήν; ἔφη ὁ Τιγράνης. Τὸν εἰπόντα νὴ Δία ὡς τὴν αὐτοῦ ψυχὴν ἂν δοίη ὥστε μή με δουλεύειν.

(4) προσέτι δὲ κάμηλοι ἡμῖν εἰσιν ἐφ' ὧν προσελῶμεν, ὧν μίαν ἑκάστην ἑκατὸν ἵπποι οὐκ ἂν ἀνάσχοιντο ἰδόντες· ἔτι δὲ πύργους πρόσιμεν ἔχοντες ἀφ' ὧν τοῖς μὲν ἡμῶν

ἀρήξομεν, ἐκείνους δὲ βάλλοντες κωλύσομεν τοῖς ἐν τῷ ἰσοπέδῳ μάχεσθαι. ἀλλ' οὐ χρὴ φοβεῖσθαι ὅτι Κροῖσος μὲν ἥρηται τῶν πολεμίων στρατηγός. οὗτος γὰρ καὶ Σύρων κακίων ἐγένετο·

(5) πιστοὺς δὲ μὴ νόμιζε φύεσθαι ἀνθρώπους· ἀλλὰ τοὺς πιστοὺς τίθεσθαι δεῖ ἕκαστον ἑαυτῷ· ἡ δὲ κτῆσις αὐτῶν ἔστιν οὐδαμῶς σὺν τῇ βίᾳ, ἀλλὰ μᾶλλον σὺν τῇ εὐεργεσίᾳ. ἐπιμέλεσθε δὲ καὶ ὅπως ἀεὶ ἀνυπέρβλητος ἄλλοις ἔσται ἡ ὑμετέρα φιλία. καὶ πρὸς τῶν θεῶν, ὦ παῖδες, τιμᾶτε ἀλλήλους, εἴ τι καὶ τοῦ ἐμοὶ χαρίζεσθαι μέλει ὑμῖν.

B.—Euripides, Heracleidae.

1. Translate with notes on words underlined:—

(a) βίᾳ νιν οὗτος τῆσδ' ἀπ' ἐσχάρας ἄγειν
ζητῶν βοὴν ἔστησε, κἄσφηλεν γόνυ
γέροντος, ὥστε μ' ἐκβαλεῖν οἴκτῳ δάκρυ.
καὶ μὴν στολήν γ' Ἕλληνα καὶ ῥυθμὸν πέπλων
ἔχει· τὰ δ' ἔργα βαρβάρου χερὸς τάδε.
σὺν δὴ τὸ φράζειν ἐστὶ μὴ μέλλειν τ' ἐμοὶ
πρίας ἀφῖξαι δεῦρο γῆς ὅρους λιπών.

(b) ΙΟ. ἀλλ' οὖν μαχοῦμαί γ' ἀριθμὸν οὐκ ἐλάσσοσι.
ΘΕ. σμικρὸν τὸ σὸν σήκωμα προστίθης φίλοις.
ΙΟ. μή τοί μ' ἔρυκε δρᾶν παρεσκευασμένον.
ΘΕ. δρᾶν μὲν σύ γ' οὐχ οἷός τε, βούλεσθαι δ' ἴσως.
ΙΟ. ὡς μὴ μενοῦντα τἄλλα σοι λέγειν πάρα.
ΘΕ. πῶς οὖν ὁπλίταις τευχέων ἄτερ φανεῖ;

(c) δισσὼ γὰρ ἀστέρ' ἱππικοῖς ἐπὶ ζυγοῖς
σταθέντ' ἔκρυψαν ἅρμα λυγαίῳ νέφει·
σὸν δὴ λέγουσι παῖδά γ' οἱ σοφώτεροι
Ἥβην θ'· ὁ δ' ὄρφνης ἐκ δυσαιθρίου νεών
βοαχιόνων ἔδειξεν ἡβητὴν τύπον.
ἀρεῖ δ' ὁ κλεινὸς Ἰόλεως Εὐρυσθέως
τέτρωρον ἅρμα πρὸς πέτραις Σκειρωνίσι.

(d) ἔστιν ἐν οὐρανῷ βεβακὼς
πεδὸς γόνος, ὦ γεραιά,
φεύγω λόγον ὡς τὸν Ἅιδα
δόμον κατέβα, πυρὸς

δεινᾷ φλογὶ σῶμα δαισθεὶς.

(e) καὶ γὰρ πατρὶ τῶνδ' Ἀθάναν
λέγουσ' ἐπίκουρον εἶναι,
καὶ τούσδ· θεᾶς πόλις
καὶ λαὸς ἔσωσε κείνας,
ἔσχεν δ' ὕβριν ἀνδρὸς, ᾧ θυ-
μὸς ἦν πρὸ δίκας βίαιος.
μήποτ' ἐμοὶ φρόνημα
ψυχά τ' ἀκόρεστος εἴη.

C.—Homer, Odyssey I.

Translate, with notes on words and phrases underlined:—

(1) πῶς ἂν ἔπειτ' Ὀδυσῆος ἐγὼ θείοιο λαθοίμην,
ὃς περὶ μὲν νόον ἐστὶ βροτῶν, περὶ δ' ἱρὰ θεοῖσιν
ἀθανάτοισιν ἔδωκε, τοὶ οὐρανὸν εὐρὺν ἔχουσιν;
ἀλλὰ Ποσειδάων γαιήοχος ἀσκελὲς αἰὲν
Κύκλωπος κεχόλωται, ὃν ὀφθαλμοῦ ἀλάωσεν,
ἀντίθεον Πολύφημον, ὃν κράτος ἐστὶ μέγιστον
πᾶσιν Κυκλώπεσσι·

(2) κήρυκες δ' αὐτοῖσι καὶ ὀτρηροὶ θεράποντες
οἱ μὲν ἄρ' οἶνον ἔμισγον ἐνὶ κρητῆρσι καὶ ὕδωρ,
οἱ δ' αὖτε σπόγγοισι πολυτρήτοισι τραπέζας
νίζον καὶ πρότιθεν, τοὶ δὲ κρέα πολλὰ δατεῦντο.

(3) εἰ μέν κεν πατρὸς βίοτον καὶ νόστον ἀκούσῃς
ἢ τ' ἂν τρυχόμενός περ ἔτι τλαίης ἐνιαυτὸν·
εἰ δέ κε τεθνηῶτος ἀκούσῃς μηδ' ἔτ' ἐόντος,
νοστήσας δὴ ἔπειτα φίλην ἐς πατρίδα γαῖαν
σῆμά τέ οἱ χεῦαι καὶ ἐπὶ κτέρεα κτερεΐξαι
πολλὰ μάλ', ὅσσα ἔοικε, καὶ ἀνέρι μητέρα δοῦναι.

(4) Τηλέμαχ', ἦ τοι ταῦτα θεῶν ἐν γούνασι κεῖται,
ὅς τις ἐν ἀμφιάλῳ Ἰθάκῃ βασιλεύσει Ἀχαιῶν·
κτήματα δ' αὐτὸς ἔχοις καὶ δώμασι σοῖσιν ἀνάσσοις
μὴ γὰρ ὅ γ' ἔλθοι ἀνὴρ ὅς τίς σ' ἀέκοντος βίηφι
κτήματ' ἀποῤῥαίσει, Ἰθάκης ἔτι ναιετάων.

FIRST YEAR.

GREEK PROSE COMPOSITION AND TRANSLATION AT SIGHT.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 4.30.

1. Translate into Greek:—

(*a*) When the ships had sailed away, the city was betrayed to the enemy.

(*b*) Those who were conquered in this battle were all killed.

(*c*) The messengers, after announcing this, went away home.

(*d*) He said that his friends were giving gifts to the boys.

(*e*) They asked how many men were crossing that river.

(*f*) Did you not see that the houses were burning?

(*g*) If you do not condemn the traitors, you will greatly injure the state.

(*h*) If we had marched more quickly, we should have reached the sea on the same day.

(*i*) I ordered him to set out at once, that he might report what had happened.

(*k*) He spoke so wisely, that he persuaded all who were present.

2. Translate into English:—

Ὁ Νηλίδης, ὥς φασιν, τεκμήρια πολλὰ ἔτι παῖς ὢν παρεῖχεν, ὅτι ἔσται ποτε ἀνὴρ ἀγαθὸς καὶ τολμηρός. πέντε γὰρ ἔτη μάλιστα γεγονὼς ἀπὸ τῆς οἰκίας μακρὸν ἐπλανήθη. πεινῶν δὲ ἐν τῇ ὁδῷ οὐδὲν ἐταράχθη, ἀλλὰ, συλλέξας ἀγρίους τινὰς καρπούς, ἐκ τούτων δεῖπνον ἐποιεῖτο, ἐς δὲ τὴν οἰκίαν, ὅθεν ἐξωρμήθη, οὐκ ἐπανῆλθε πρὶν νὺξ ἐγένετο. ἰδοῦσα οὖν αὐτὸν ἡ μήτηρ, "ὦ παῖ," ἔφη, "θαυμάζω ὡς οὔ σε ἠνάγκασεν ὁ φόβος θᾶσσον ἐπανιέναι." ὁ δὲ παῖς ἀντεῖπεν, "ἀλλ', ὦ μῆτερ, τίς ἐστιν ὁ φόβος; οὐ γὰρ ἐμοὶ γνώριμός ἐστιν.

FIRST YEAR.

GREEK HISTORY.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 4.30 TO 5.30.

1. Where are the causes of the Persian wars to be sought? What incident directly led to the great struggle? How is the name of Solon connected with this latter?

2. How is the name of Hippias associated with that of the Spartan King Cleomenes and the Ionic Revolt?

3. Describe in detail the attempt of Athens to make an alliance with Persia. What were the events leading to it? How is the result of significance?

4. Describe fully the great battle which ended so fitly the work begun at Marathon. Give the date and consequences.

5. By the settlement of what question, after the battle of Mykalê, was the future course of Athenian history determined?

SECOND YEAR.

GREEK AUTHORS.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

(*Answers to A, B and C to be shown up in separate books.*)

A.—SOPHOCLES, AJAX.

1. Translate, with notes on words and phrases underlined:—

(*a*) οὐκέτι· λαμπρᾶς γὰρ ἄτερ στεροπῆς
ἄξας ὀξὺς νότος ὡς λήγει.
καὶ νῦν φρόνιμος νέον ἄλγος ἔχει·
τὸ γὰρ ἐσλεύσσειν οἰκεῖα πάθη,
μηδενὸς ἄλλου παραπράξαντος,
μεγάλας ὀδύνας ὑποτείνει.

(*b*) καὶ τὸν μὲν ἥστο πλεῖστον ἄφθογγος χρόνον·
ἔπειτ' ἐμοὶ τὰ δεῖν' ἐπηπείλησ' ἔπη,
εἰ μὴ φανοίην πᾶν τὸ συντυχὸν πάθος,
κἀνήρετ' ἐν τῷ πράγματος κυροῖ ποτέ.

κἀγώ, φίλοι, δείσασα τοὐξειργασμένον
ἔλεξα πᾶν ὅσονπερ ἐξηπιστάμην.
ὁ δ' εὐθὺς ἐξῴμωξεν οἰμωγὰς λυγράς,
ἃς οὔποτ' αὐτοῦ πρόσθεν εἰσήκουσ' ἐγώ.
πρὸς γὰρ κακοῦ τε καὶ βαρυψύχου γόους
τοιούσδ' ἀεί ποτ' ἀνδρὸς ἐξηγεῖτ' ἔχειν·

(c) AI. κόμιζέ νύν μοι παῖδα τὸν ἐμόν, ὡς ἴδω.
TE. καὶ μὴν φόβοισί γ' αὐτὸν ἐξελυσάμην.
AI. ἐν τοῖσδε τοῖς κακοῖσιν, ἤ τί μοι λέγεις;
TE. μὴ σοί γέ που δύστηνος ἀντήσας θάνοι.
AI. πρέπον γέ τἂν ἦν δαίμονος τοὐμοῦ τόδε.
TE. ἀλλ' οὖν ἐγὼ 'φύλαξα τοῦτό γ' ἀρκέσαι.
AI. ἐπῆνεσ' ἔργον καὶ πρόνοιαν ἣν ἔθου.
TE. τί δῆτ' ἂν ὡς ἐκ τῶνδ' ἂν ὠφελοῖμί σε;
AI. δός μοι προσειπεῖν αὐτὸν ἐμφανῆ τ' ἰδεῖν.
TE. καὶ μὴν πέλας γε προσπόλοις φυλάσσεται.
AI. τί δῆτα μέλλει μὴ οὐ παρουσίαν ἔχειν;

(d) ἐγὼ δ' ὁ τλάμων παλαιὸς ἀφ' οὗ χρόνος
Ἰδαῖα μίμνων λειμώνι' ἔπαυλα μηνῶν
ἀνήριθμος αἰὲν εὐνῶμαι,
χρόνῳ τρυχόμενος.
Mss. Ἰδαία μίμνων λειμωνία ποίᾳ μήλων
ἀνήριθμος αἰὲν εὐνόμαι.

(e) οἴμοι, τί δράσω; πῶς σ' ἀποσπάσω πικροῦ
τοῦδ' αἰόλου κνώδοντος, ὦ τάλας, ὑφ' οὗ
φονέως ἄρ' ἐξέπνευσας; εἶδες ὡς χρόνῳ
ἔμελλέ σ' Ἕκτωρ καὶ θανὼν ἀποφθίσειν;
σκέψασθε, πρὸς θεῶν, τὴν τύχην δυοῖν βροτοῖν.
Ἕκτωρ μέν, ᾧ δὴ τοῦδ' ἐδωρήθη πάρα,
ζωστῆρι πρισθεὶς ἱππικῶν ἐξ ἀντύγων
ἐκνάπτετ' αἰέν, ἔστ' ἀπέψυξεν βίον·
οὗτος δ' ἐκείνου τήνδε δωρεὰν ἔχων
πρὸς τοῦδ' ὄλωλε θανασίμῳ πεσήματι.

(f) ἐκεῖνος οὔτε στεφάνων
οὔτε βαθειᾶν κυλίκων
νεῖμεν ἐμοὶ τέρψιν ὁμιλεῖν,
οὔτε γλυκὺν αὐλῶν ὄτοβον,

δύσμορος, οὔτ' ἐννυχίαν
τέρψιν ἰαύειν·

2. Comment on:—

(a) θαρσῶν δὲ μίμνε μηδὲ συμφορὰν δέχου
τὸν ἄνδρα.

(b) οὐκέτ' ἄνδρα μὴ τόνδ' ἴδητε.

(c) ἀνδρί τοι χρεὼν
μνήμην προσεῖναι, τερπνὸν εἴ τί που πάθοι.
L πάθῃ; other Mss. πάθοι.

(d) τήνδε δ' ἔξοδον
ὀλεθρίαν Αἴαντος ἐλπίζει φέρειν.

(e) κοὐδεὶς ἐπίσταταί με συμμαθεῖν τόπος.

(f) ἀλλ' ἄνδρα χρή, κἂν σῶμα γεννήσῃ μέγα,
δοκεῖν πεσεῖν ἂν κἂν ἀπὸ σμικροῦ κακοῦ.

B.—THUCYDIDES, III.

1. Translate with notes on words underlined:—

(a) καὶ ἅμα ἑώρων τοὺς Πελοποννησίους τὴν πρὸς Κιθαιρῶνα καὶ Δρυὸς κεφαλὰς τὴν ἐπ' Ἀθηνῶν φέρουσαν μετὰ λαμπάδων διώκοντας. καὶ ἐπὶ μὲν ἓξ ἢ ἑπτὰ στα δίους οἱ Πλαταιῆς τὴν ἐπὶ τῶν Θηβῶν ἐχώρησαν, ἔπειθ' ὑποστρέψαντες ἦσαν τὴν πρὸς τὸ ὄρος φέρουσαν ὁδὸν ἐς Ἐρύθρας καὶ Ὑσιάς, καὶ λαβόμενοι τῶν ὀρῶν διαφεύγουσιν ἐς τὰς Ἀθήνας, ἄνδρες δώδεκα καὶ διακόσιοι ἀπὸ πλειόνων.

(b) οἱ δὲ Λακεδαιμόνιοι δικασταὶ νομίζοντες τὸ ἐπερώτημα σφίσιν ὀρθῶς ἔξειν, αὖθις τὸ αὐτὸ ἕνα ἕκαστον παραγαγόντες καὶ ἐρωτῶντες, εἴ τι Λακεδαιμονίους καὶ τοὺς ξυμμάχους ἀγαθὸν ἐν τῷ πολέμῳ δεδρακότες εἰσίν, ὁπότε μὴ φαῖεν, ἀπάγοντες ἀπέκτεινον, καὶ ἐξαίρετον ἐποιήσαντο οὐδένα.

(c) "Ἡμῶν δὲ τό τε ὑπάρχον πρότερον, ᾧπερ καὶ ἀνεπιστήμονες ἔτι ὄντες ἀπετολμήσαμεν, βεβαιότερον νῦν· καὶ τῆς δοκήσεως προσγεγενημένης αὐτῷ, τὸ κρατίστους εἶναι, εἰ τοὺς κρατίστους ἐνικήσαμεν, διπλασία ἑκάστου ἡ ἐλπίς. τὰ δὲ πολλὰ πρὸς τὰς ἐπιχειρήσεις ἡ μεγίστη ἐλπὶς μεγίστην καὶ τὴν προθυμίαν παρέχεται.

(*d*) "Ἔτι καὶ ἐκ τῶν παρόντων, ὦ Ἀθηναῖοι καὶ ξύμμαχοι, ἐλπίδα χρὴ ἔχειν (ἤδη τινὲς καὶ ἐκ δεινοτέρων ἢ τοιῶνδε ἐσῴθησαν), μηδὲ καταμέμφεσθαι ὑμᾶς ἄγαν αὐτοὺς μήτε ταῖς ξυμφοραῖς μήτε ταῖς παρὰ τὴν ἀξίαν νῦν κακοπαθείαις.

(*e*) τὸ γὰρ ἀποκινδυνεύειν πρὸς ἀνθρώπους ἀπονενοημένους οὐ πρὸς ἐκείνων μᾶλλον ἦν ἔτι ἢ πρὸς τῶν Ἀθηναίων, καὶ ἅμα φειδώ τε τις ἐγίγνετο, ἐπ' εὐπραγίᾳ ἤδη σαφεῖ, μὴ προανολωθῆναι τῳ, καὶ ἐνόμιζον καὶ ὡς ταύτῃ τῇ ἰδέᾳ καταδαμασάμενοι λήψεσθαι αὐτούς.

C.—Homer, Odyssey X.

Translate, with *brief* notes on words underlined:—

(*a*) ἔνθ' ἐπεὶ ἐς λιμένα κλυτὸν ἤλθομεν, ὃν πέρι πέτρη
ἠλίβατος τετύχηκε διαμπερὲς ἀμφοτέρωθεν,
ἀκταὶ δὲ προβλῆτες ἐναντίαι ἀλλήλῃσιν
ἐν στόματι προὔχουσιν, ἀραιὴ δ' εἴσοδός ἐστιν,
ἔνθ' οἵ γ' εἴσω πάντες ἔχον νέας ἀμφιελίσσας.
αἱ μὲν ἄρ' ἔντοσθεν λιμένος κοίλοιο δέδεντο
πλησίαι· οὐ μὲν γάρ ποτ' ἀέξετο κῦμά γ' ἐν αὐτῷ,
οὔτε μέγ' οὔτ' ὀλίγον, λευκὴ δ' ἦν ἀμφὶ γαλήνη.
αὐτὰρ ἐγὼν οἶος σχέθον ἔξω νῆα μέλαιναν,
αὐτοῦ ἐπ' ἐσχατιῇ, πέτρης ἐκ πείσματα δήσας·
ἔστην δὲ σκοπιὴν ἐς παιπαλόεσσαν ἀνελθών.

(*b*) ὡς δ' ὅτ' ἂν ἄγραυλοι πόριες περὶ βοῦς ἀγελαίας,
ἐλθούσας ἐς κόπρον, ἐπὴν βοτάνης κορέσωνται,
πᾶσαι ἅμα σκαίρουσιν ἐναντίαι· οὐδ' ἔτι σηκοὶ
ἴσχουσ', ἀλλ' ἁδινὸν μυκώμεναι ἀμφιθέουσι
μητέρας· ὣς ἐμὲ κεῖνοι, ἐπεὶ ἴδον ὀφθαλμοῖσι,
δακρυόεντες ἔχυντο· δόκησε δ' ἄρα σφίσι θυμὸς
ὡς ἔμεν ὡς εἰ πατρίδ' ἱκοίατο καὶ πόλιν αὐτὴν
τρηχείης Ἰθάκης, ἵνα τ' ἔτραφεν ἠδ' ἐγένοντο·

SECOND YEAR.

GREEK PROSE COMPOSITION AND SIGHT TRANSLATION.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 4.30.

1. Translate into Greek:—

The customs of the Indoi differ greatly from those in Greece. For there, if anyone owes money, the one to whom it is owed does not bring an action or endeavor by means of the law to force the other to pay; nor again does he threaten to kill the man, or to burn his house, or anything of the kind, as is the custom among some of the barbarians. On the contrary, when, after often coming to him and asking him to pay, he obtains nothing of what he desires, he sends a message that if the other does not pay, he will kill himself at his door. And the debtor, fearing that, if he should do so, the dead man's spirit would come to him in his sleep and make him live a wretched life, at last pays his debt.

2. Translate into English:—

(*a*) Battle in the harbour of Pylos.

καὶ οἱ μὲν Λακεδαιμόνιοι οὔτε ἀντανήγοντο οὔτε ἃ διενοήθησαν, τὰς ἔσπλους φυλάξαι, ἔτυχον ποιήσαντες, ἡσυχάζοντες δ' ἐν τῇ γῇ τάς τε ναῦς ἐπλήρουν καὶ παρεσκευάζοντο, ἢν ἐσπλέῃ τις, ὡς ἐν τῷ λεμένι ὄντι οὐ σμικρῷ ναυμαχήσοντες. οἱ δ' Ἀθηναῖοι γνόντες καθ' ἑκάτερον τὸν ἔσπλουν ὥρμησαν ἐπ' αὐτούς, καὶ τὰς μὲν πλείους τῶν νεῶν ἐς φυγὴν κατέστησαν, καὶ ἐπιδιώκοντες ἔτρωσαν μὲν πολλὰς, πέντε δ' ἔλαβον, καὶ μίαν τούτων αὐτοῖς ἀνδράσι. ταῖς δὲ λοιπαῖς ἐν τῇ γῇ καταπεφευγυίαις ἐνέβαλλον. αἱ δὲ καὶ πληρούμεναι ἔτι πρὶν ἀνάγεσθαι ἐκόπτοντο· καί τινας καὶ ἀναδούμενοι κενὰς εἷλκον, τῶν ἀνδρῶν ἐς φυγὴν ὡρμημένων.

(*b*) Disaster has befallen the Trojans.

κακῶς πέπρακται, κἀπὶ τοῖς κακοῖσι πρὸς
αἴσχιστα· καίτοι δὶς τόσον κακὸν τόδε·
θανεῖν γὰρ εὐκλεῶς μέν, εἰ θανεῖν χρεών,

λυπρὸν μὲν οἶμαι τῷ θανόντι. πῶς γὰρ οὔ;
τοῖς ζῶσι δ' ὄγκος καὶ δόμων εὐδοξία.
ἡμεῖς δ' ἀβούλως κἀκλεῶς ὀλώλαμεν.
ὀδύνη με τείρει, κοὐκέτ' ὀρθοῦμαι τάλας.
καὶ ξυμφορὰν μὲν οἶδ' ὁρῶν, τρόπῳ δ' ὅτῳ
τεθνᾶσιν οἱ θανόντες οὐκ ἔχω φράσαι.

SECOND YEAR.

GREEK HISTORY AND LITERATURE.

TUESDAY, APRIL 14TH, 1903:—4.30 TO 5.30 P.M.

(*Answers to A and B to be shown up in separate books.*)

A.—HISTORY.

1. What was the origin of the Confederacy of Delos? What event marked the change to an Athenian Empire? Indicate briefly the connexion of this with other events of the same period and show how far it may be considered as marking the culmination of Athenian power. Give dates.

2. What were the chief constitutional changes at Athens during the ascendancy of Pericles? Give dates. How far were these inevitable ,and how far the results of a deliberate policy? Give a brief sketch of the Athenian constitution in 432 B.C.

3. With what events are the following names connected? Give dates. Ithomé, Thasos, Nisaea, Coronea, Gylippus, Brasidas, Delium, Sybota, Mantinea.

B.—LITERATURE.

(*Not more than three questions to be attempted.*)

1. What is meant by the "originality" of Greek literature? Illustrate by reference to its several branches, giving names in each.

2. Give a short description of Homeric Society.

3. Write a brief note on each of the following:—Alcaeus, Solon, Tyrtaeus, Aristarchus, Thespis. Who were the Rhapsodists? What was a Trilogy?

4. Give a short sketch of the origin and growth of Comedy.

5. Describe briefly the moral and religious teaching of Ancient Greek Tragedy.

THIRD AND FOURTH YEARS.

GREEK AUTHORS.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

(Answers to A, B and C to be shown up in separate books.)

A.—DEMOSTHENES.

Translate, adding a brief note where you think it desirable:—

(*a*) Οὐ γὰρ οὕτω γ' εὐήθης ἐστὶν οὐδείς, ὃς ὑπολαμβάνει τὸν Φίλιππον τῶν μὲν ἐν Θρᾴκῃ κακῶν (τί γὰρ ἂν ἄλλο τις εἴποι Δρόγγιλον καὶ Καβύλην καὶ Μάστειραν καὶ ἃ νῦν ἐξαιρεῖ) τούτων μὲν ἐπιθυμεῖν καὶ ὑπὲρ τοῦ ταῦτα λαβεῖν καὶ πόνους καὶ χειμῶνας καὶ τοὺς ἐσχάτους κινδύνους ὑπομένειν, τῶν δ' Ἀθηναίων λιμένων καὶ νεωρίων καὶ τριήρων καὶ τῶν ἔργων τῶν ἀργυρείων καὶ τοσούτων προσόδων οὐκ ἐπιθυμεῖν ἀλλὰ ταῦτα μὲν ὑμᾶς ἐάσειν ἔχειν ὑπὲρ δε τῶν μελινῶν καὶ τῶν ὀλυρῶν τῶν ἐν τοῖς Θρᾳκίοις σιροῖς ἐν τῷ βαράθρῳ χειμάζειν.

(*b*) Ὁρῶν δὲ ταῦθ' ὁ δῆμος ὁ τῶν Ὠρειτῶν ἀντὶ τοῦ τῷ μὲν βοηθεῖν τοὺς δ' ἀποτυμπανίσαι τοῖς μὲν οὐκ ὠργίζετο τὸν δ' ἐπιτήδειον ταῦτα παθεῖν ἔφη κἀπέχαιρεν.

(*c*) Οὐκοῦν ἐνόμιζον ἐκεῖνοι τῆς πάντων τῶν Ἑλλήνων σωτηρίας ἑαυτοῖς ἐπιμελητέον εἶναι· οὐ γὰρ ἂν αὐτοῖς ἔμελ' εἴ τις ἐν Πελοποννήσῳ τινὰς ὠνεῖται καὶ διαφθείρει μὴ τοῦθ' ὑπολαμβάνουσι.

(*d*) Εἰ δὲ ἐκ τούτων τὰ δίκαια τίθενται καὶ τὴν εἰρήνην ταύτην ὁρίζονται ὅτι μὲν δήπουθεν οὔθ' ὅσι' οὔτ' ἀνεκτὰ λέγουσιν οὔθ' ὑμῖν ἀσφαλῆ, δῆλόν ἐστιν ἅπασιν, οὐ μὴν ἀλλ' ἐναντία συμβαίνει ταῖς κατηγορίαις ἃς Διοπειθους κατηγοροῦσι καὶ αὐτὰ ταῦτα λέγειν αὐτούς.

(*e*) Ἐγὲ δ' ὅσα μέν τις αἰτιᾶταί τινα τούτων οὓς κατὰ τοὺς νόμους ἐφ' ὑμῖν ἐστιν, ὅταν βούλησθε, κολάζειν, κἂν ἤδη δοκῇ κἂν ἐπισχοῦσιν περὶ αὐτῶν σκοπεῖν ἐγχωρεῖν ἡγοῦμαι.

B. — Æschylus, Prometheus Vinctus

1. Translate, with note on words and phrases underlined:—

(*a*) ΚΡ. καὶ τήνδε νῦν πόρπασον ἀσφαλῶς, ἵνα
μάθῃ σοφίστης ὢν Διὸς νωθέστερος.
ΗΦ. πλὴν τοῦδ' ἂν οὐδεὶς ἐνδίκως μέμψαιτό μοι.
ΚΡ. ἀδαμαντίνου νῦν σφηνὸς αὐθάδη γνάθον
στέρνων διαμπὰξ πασσάλευ' ἐρρωμένως.
ΗΦ. αἰαῖ, Προμηθεῦ, σῶν ὑπὲρ στένω πόνων
ΚΡ. σὺ δ' αὖ κατοκνεῖς τῶν Διὸς τ' ἐχθρῶν ὕπερ
στένειν; ὅπως μὴ σαυτὸν οἰκτιεῖς ποτέ.

(*b*) οἶδ' ὅτι τραχὺς καὶ παρ' ἑαυτῷ
τὸ δίκαιον ἔχων· ἔμπας οἵω
μαλακογνώμων
ἔσται ποθ' ὅταν ταύτῃ ῥαισθῇ·
τὴν δ' ἀτέραμνον στορέσας ὀργὴν
εἰς ἀρθμὸν ἐμοὶ καὶ φιλότητα
σπεύδων σπεύδοντί ποθ' ἥξει.

(*c*) τρόπους δὲ πολλοὺς μαντικῆς ἐστοίχισα,
κἄκρινα πρῶτος ἐξ ὀνειράτων ἃ χρὴ
ὕπαρ γενέσθαι, κληδόνας τε δυσκρίτους
ἐγνώρισ' αὐτοῖς ἐνοδίους τε συμβόλους.
γαμψωνύχων τε πτῆσιν οἰωνῶν σκεθρῶς
διώρισ', οἵτινές τε δεξιοὶ φύσιν
εὐωνύμους τε, καὶ διαιταν ἥντινα
ἔχουσ' ἕκαστοι, καὶ πρὸς ἀλλήλους τινες
ἔχθραι τε καὶ στέργηθρα καὶ συνεδρίαι·
σπλάγχνων τε λειότητα, καὶ χροιὰν τίνα
ἔχοντ' ἂν εἴη δαίμοσιν πρὸς ἡδονήν,
χολῆς λοβοῦ τε ποικίλην εὐμορφίαν.

(*d*) τέλος δ' ἐναργὴς βάξις ἦλθεν Ἰνάχῳ
σαφῶς ἐπισκήπτουα καὶ μυθουμένη
ἔξω δόμων τε καὶ πάτρας ὠθεῖν ἐμέ,
ἄφετον ἀλᾶσθαι γῆς ἐπ' ἐσχάτοις ὅροις·
κεἰ μὴ θέλοι, πυρωτὸν ἐκ Διὸς μολεῖν
κεραυνὸν, ὃς πᾶν ἐξαϊστώσει γένος.

(*e*) Διὸς δέ τοι
πτηνὸς κύων, δαφοινὸς ἀετὸς, λάβρως
διαρτάμήσει σώματος μέγα ῥάκος,

ἄκλητος ἕρπων δαιταλεὺς πανήμερος,
κελαινόβρωτον δ' ἦπαρ ἐκθοινάσεται.

2. Annotate:—

(*a*) δολῷ δὲ τοὺς ὑπερσχόντας κρατεῖν.

(*b*) οὐκ ἔστιν ὅτῳ μείζονα μοῖραν νείμαιμ' ἢ σοί.

(*c*) πάντων μετασχὼν καὶ τετολμηκὼς ἐμοί.

(*d*) ὡς τἀποκλαῦσαι κἀποδύρασθαι τύχας
ἐνταῦθ' ὅπου μέλλοι τις οἴσεσθαι δάκρυ
πρὸς τῶν κλυόντων, ἀξίαν τριβὴν ἔχει.

(*e*) τοιοῦτο μέν σοι τοῦτο φρούριον λέγω.

(*f*) οὐ γὰρ δή που τοῦτο γε τλητὸν παρέσυρας ἔπος.

3. Comment on the following readings of the Medicean MS:—

(*a*) ὑπαίθριος δεσμοῖς πασσαλευμένος·

(*b*) μόνον δὴ πρόσθεν ἄλλον ἐν πόνοις
δαμέντ' ἀκαμαντοδέτοις
Τιτᾶνα λύμαις εἰσιδόμαν θεόν,
Ἄτλανθ' ὡς αἰὲν ὑπέροχον σθένος
κραταιὸν οὐράνιόν τε πόλον
νώτοις ὑποστενάζει.
βοᾷ δὲ πόντιος κλύδων
ξυμπίτνων στένει βαθύς
κελαινὸς δ' Ἄϊδος ὑποβρέμει μυχὸς γᾶς.

(*c*) ἀλλά μοι τορῶς
τέκμηρον ὅ τι μ' ἐπαμμένει
παθεῖν τί μὴ χρὴ φάρμακον νόσου
(=γεγυμνάκασιν, οὐδ' ἔχω μαθεῖν ὅπᾳ)

(*d*) ἐκηβόλοις τόξοισιν ἐξηρτημένοι.

(*e*) ἐνταῦθα δή σε Ζεὺς τίθησιν ἔμφρονα
ἐπαφῶν ἀταρβεῖ χειρὶ καὶ θιγὼν μόνον.
ἐπώνυμον δὲ τῶν Διὸς γεννημάτων
τέξεις κελαινὸν Ἔπαφον.

4. Indicate, with a sketch-map, the course of Io's wanderings.

5. What are to be the conditions of Prometheus' release?

C.—KYNASTON'S GREEK ELEGIAC POETS.

Translate:—

(1) ἀλλὰ Ζεὺς πάντων ἐφορᾷ τέλος, ἐξαπίνης δὲ
ὥστ' ἄνεμος νεφέλας αἶψα διεσκέδασεν
ἠρινὸς, ὃς πόντου πολυκύμονος ἀτρυγέτοιο

πυθμένα κινήσας, γὴν κατὰ πυροφόρον
δηώσας καλὰ ἔργα. Θεῶν ἕδος αἰπὺν ἱκάνει
οὐρανὸν, αἰθρίην δ' αὖθις ἔθηκεν ἰδεῖν·
λάμπει δ' ἠελίοιο μένος κατὰ πίονα γαῖαν
καλὸν, ἀτὰρ νεφέων οὐδὲν ἔτ' ἐστὶν ἰδεῖν·
τοιαύτη Ζηνὸς πέλεται τίσις, οὐδ' ἐφ' ἑκάστῳ,
ὥσπερ θνητὸς ἀνὴρ, γίγνεται ὀξύχολος.

(2) Στᾶλαι καὶ Σειρῆνες ἐμαὶ καὶ πένθιμε κρωσσὲ,
ὅστις ἔχεις Ἀΐδα τὰν ὀλίγαν σποδίαν,
τοῖς ἐμὸν ἐρχομένοισι παρ' ἠρίον εἴπατε χαίρειν,
αἴτ' ἀστοὶ τελέθωντ', αἴθ' ἑτεροπτόλιες·
χὤτι με νύμφαν μ' ἐῦσαν ἔχει τάφος, εἴπατε καὶ τό
χὤτι πατήρ μ' ἐκάλει Βαυκίδα, χὤτι γένος
Τηνία, ὡς εἰδῶντι· καὶ ὅττι μοι ἀ συνεταιρὶς
Ἥρινν' ἐν τύμβῳ γράμμ' ἐχάραξε τόδε.

(3) εἶπεν. ὁ δὲ σκίπωνα, γεροντικὸν ὅπλον, ἀείρας,
ἤνιδε, κεῖνοί σοι πᾶν ἐρέουσιν ἔπος.
(οἱ δ' ἄρ' ὑπὸ πληγῇσι θοὰς βέμβικας ἔχοντες
ἔστρεφον εὐρείῃ παῖδες ἐνὶ τριόδῳ).
κείνων ἔρχεο, φησὶ, μετ' ἴχνια· χὠ μὲν ἐπέστη
πλησίον. οἱ δ' ἔλεγον τὴν κατὰ σαυτὸν ἔλα.

THIRD AND FOURTH YEARS.

GREEK PROSE AND TRANSLATION AT SIGHT.

WEDNESDAY, APRIL 15TH, 1903:—AFTERNOON, 2 TO 5.

1. Translate into Greek:—

The consuls immediately moved the army to the neighbourhood of Hannibal, with the intention of offering battle. But when Paullus observed the open plain, he was desirous to put off an engagement, and manœuvred so as to draw the enemy into ground less favourable for the action of cavalry. Varro, however, thought otherwise; and now appeared the evil of both Consuls being joined in command of the same army. The Consuls were, by the constitution, equal, and Varro was far too confident of success to give way to his more experienced colleague. Paullus felt bitterly the truth of Fabius' parting injunction; "Remember that you will have to oppose not only Hannibal, but also Varro."

2. Translate into English:—

(*a*) οὐδὲν γὰρ αὐτοῖς ἀποστᾶσι γέγονεν ὧν προσεδόκησαν, ἀλλ' ἀντὶ μὲν τῆς ἐλευθερίας τοὐνάντίον ἀποβέβηκεν· ἀπολέσαντες γὰρ αὐτῶν τοὺς βελτίστους ἐπὶ τοῖς χειρίστοις τῶν πολιτῶν γεγόνασιν, ἀντὶ δὲ τῆς αὐτονομίας εἰς πολλὰς καὶ δεινὰς ἀνομίας ἐμπεπτώκασιν, εἰθισμένοι δὲ τὸν ἄλλον χρόνον μεθ' ἡμῶν ἐφ' ἑτέρους ἰέναι, νῦν τοὺς ἄλλους ὁρῶσιν ἐφ' αὑτοὺς στρατευομένους, καὶ τὰς στάσεις, ἃς ἐπυνθάνοντο πρότερον παρ' ἑτέροις οὔσας, νῦν παρ' αὑτοῖς ὀλίγου δεῖν καθ' ἑκάστην τὴν ἡμέραν γιγνομένας. οὕτω δ' ὠμαλισμένοι ταῖς συμφοραῖς εἰσὶν ὥστε μηδένα διαγνῶναι δύνασθαι τοὺς κάκιστα πράττοντας αὐτῶν· οὐδεμία γὰρ ἐστι τῶν πόλεων ἀκέραιος.

(*b*) ἐπεὶ δ' ἐν οἴκοις ἦμεν, ἐννέπει τάδε·
λούτρ' ὡς τάχιστα τοῖς ξένοις τις αἰρέτω
ὡς ἀμφὶ βωμὸν στῶσι χερνίβων πέλας.
ἀλλ' εἶπ' Ὀρέστης· ἀρτίως ἡγνίσμεθα
λουτροῖσι καθαροῖς ποταμίων ῥείθρων ἄπο.
εἰ δὲ ξένους ἀστοῖσι συνθύειν χρεών,
Αἴγισθ', ἕτοιμοι κοὐκ ἀπαρνούμεσθ', ἄναξ.
Τοῦτον μὲν οὖν μεθεῖσαν ἐν μέσῳ λόγον·
λόγχας δὲ θέντες δεσπότου φρουρήματα
δμῶες πρὸς ἔργον πάντες ἵεσαν χέρας.
οἱ μὲν σφαγεῖον ἔφερον, οἱ δ' ἦρον κανᾶ,
ἄλλοι δὲ πῦρ ἀνῆπτον ἀμφί τ' ἐσχάρας
λέβητας ὤρθουν· πᾶσα δ' ἐκτύπει στέγη.

THIRD AND FOURTH YEARS.

GREEK HISTORY.

FROM THE ACCESSION OF ALEXANDER THE GREAT.

AND GREEK CONSTITUTIONAL HISTORY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

(*Answers to A and B to be shown up in separate books.*)

A.—GREEK HISTORY, 336 B.C.-281 B.C.

N.B.—*Dates should be given where possible.*

1. Draw a sketch map to shew the line of Alexander's march from Europe to India and back to Babylon.

2. Sketch the career of Demosthenes from the invasion of Asia to his death.

3. Give a brief account of the history of the Greek world from the death of Eumenes in 316 B.C. to 301 B.C.

4. What are our principal authorities for the history of Alexander and the period immediately succeeding?

5. Give a short account of the condition of philosophy and literature in the time of the first two Ptolemies.

6. What do you know of Eubulus, Hyperides, Jerome of Kardia, Arrian, Demetrius Phalereus, Bessus, Clitus, Lycurgus, Peukestas, Stratocles, Lachares, Dromokleides?

B.—Greek Constitutional History.

1. Note the chief differences between the state of society depicted in Homer and early Greece as known from recent investigations. Indicate the main lines of race-difference. What is meant by the term Pelasgi?

2. How far have the successive stages of constitutional development, indicated in Plato's Republic, their counterparts in History? Indicate these stages in the history of Athens, with dates.

3. What is meant by the "Epoch of the tyrants"? Show the causes of the phenomenon, illustrating from modern parallels. Indicate the value of "tyranny" as a stage in development.

4. What were regarded by the Greeks as the characteristic features of Democracy? Give the dates at which each of these became true of the Democracy of Athens.

5. Compare and contrast the constitutions of Sparta and Crete. Which lasted longest, and why? Illustrate from Roman and English History.

6. Explain:—Aisymnetes, Apagoge, Proedri, Trierarch, Eisphora, Hypomosia, Dokimasia, Euthyna, Nomothetae, Epobelia.

SECOND YEAR.

GREEK—ADVANCED SECTION.

THURSDAY, APRIL 23RD:—AFTERNOON, 2 TO 5.

PLATO, LACHES.

1. Translate, with notes on words and phrases underlined:—

(*a*) ἀλλ' εἴ τι καὶ σύ, ὦ παῖ Σωφρονίσκου, ἔχεις τῷδε τῷ σαυτοῦ δημότῃ ἀγαθὸν συμβουλεῦσαι, χρὴ συμβουλεύειν· δίκαιος δ' εἶ· καὶ γὰρ πατρικὸς ἡμῖν φίλος τυγχάνεις ὤν. ἀεὶ γὰρ ἐγὼ καὶ ὁ σὸς πατὴρ ἑταίρω τε καὶ φίλω ἦμεν, καὶ πρότερον ἐκεῖνος ἐτελεύτησε, πρίν τι ἐμοὶ διενεχθῆναι. περιφέρει δέ τίς με καὶ μνήμη ἄρτι τῶνδε λεγόντων· τὰ γὰρ μειράκια τάδε πρὸς ἀλλήλους οἴκοι διαλεγόμενοι θαμὰ ἐπιμέμνηνται Σωκράτους καὶ σφόδρα ἐπαινοῦσιν· οὐ μέντοι πώποτε αὐτοὺς ἀνηρώτησα, εἰ τὸν Σωφρονίσκου λέγοιεν.

(*b*) ἦν δὲ γέλως καὶ κρότος ὑπὸ τῶν ἐκ τῆς ὁλκάδος ἐπί τε τῷ σχήματι αὐτοῦ, καὶ ἐπειδὴ βαλόντος τινὸς λίθῳ παρὰ τοὺς πόδας αὐτοῦ ἐπὶ τὸ κατάστρωμα ἀφίεται τοῦ δόρατος, τότ' ἤδη καὶ οἱ ἐκ τῆς τριήρους οὐκέτι οἷοί τ' ἦσαν τὸν γέλωτα κατέχειν, ὁρῶντες αἰωρούμενον ἐκ τῆς ὁλκάδος τὸ δορυδρέπανον ἐκεῖνο.

(*c*) εἰ δ' αὐτοὶ εὑρεταὶ γεγονότε τοῦ τοιούτου, δότε παράδειγμα, τίνων ἤδη ἄλλων ἐπιμεληθέντες ἐκ φαύλων καλούς τε κἀγαθοὺς ἐποιήσατε. εἰ γὰρ νῦν ἄρξεσθε πρῶτον παιδεύειν, σκοπεῖν χρὴ μὴ οὐκ ἐν τῷ Καρὶ ὑμῖν ὁ κίνδυνος κινδυνεύηται, ἀλλ' ἐν τοῖς ὑμετέροις τε καὶ ἐν τοῖς τῶν φίλων παισί, καὶ ἀτεχνῶς τὸ λεγόμενον κατὰ τὴν παροιμίαν ὑμῖν συμβαίνῃ ἐν πίθῳ ἡ κεραμεία γιγνομένη. λέγετε οὖν τί τούτων ἢ φατὲ ὑμῖν ὑπάρχειν τε καὶ προσήκειν ἢ οὔ φατε.

(*d*) ΣΩ. Καὶ τὸν μετ' ἐπιστήμης ἄρα ἱππικῆς καρτεροῦντα ἐν ἱππομαχίᾳ ἧττον φήσεις ἀνδρεῖον εἶναι ἢ τὸν ἄνευ ἐπιστήμης.

ΛΑ. Ἔμοιγε δοκεῖ.

ΣΩ. Καὶ τὸν μετὰ σφενδονητικῆς ἢ τοξικῆς ἢ ἄλλης τινὸς τέχνης καρτεροῦντα.

ΛΑ. Πάνυ γε.

ΣΩ. Καὶ ὅσοι δὴ ἐθέλουσιν εἰς φρέαρ καταβαίνοντες καὶ κολυμβῶντες καρτερεῖν ἐν τούτῳ τῷ ἔργῳ, μὴ ὄντες δεινοί, ἢ ἔν τινι ἄλλῳ τοιούτῳ ἀνδρειοτέρους φήσεις τῶν ταῦτα δεινῶν.

ΛΑ. Τί γὰρ ἄν τις ἄλλο φαίη, ὦ Σώκρατες;

ΣΩ. Οὐδέν, εἴπερ οἷοιτό γε οὕτως.

ΛΑ. Ἀλλὰ μὴν οἶμαί γε.

ΣΩ. Καὶ μήν που ἀφρονεστέρως γε, ὦ Λάχης, οἱ τοιοῦτοι κινδυνεύουσίν τε καὶ καρτεροῦσιν ἢ οἱ μετὰ τέχνης αὐτὸ πράττοντες.

ΛΑ. Φαίνονται.

ΣΩ. Οὐκοῦν αἰσχρὰ ἡ ἄφρων τόλμα τε καὶ καρτέρησις ἐν τῷ πρόσθεν ἐφάνη ἡμῖν οὖσα καὶ βλαβερά;

ΛΑ. Πάνυ γε.

(e) ΣΩ. Δῆλον δή, ὦ Νικία, ὅτι οὐδὲ τὴν Κρομμυωνίαν ὑν πιστεύεις σύ γε ἀνδρείαν γεγονέναι. τοῦτο δὲ λέγω οὐ παίζων, ἀλλ' ἀναγκαῖον οἶμαι τῷ ταῦτα λέγοντι μηδενὸς θηρίου ἀποδέχεσθαι ἀνδρείαν, ἢ συγχωρεῖν θηρίον τι οὕτω σοφὸν εἶναι, ὥστε ἃ ὀλίγοι ἀνθρώπων ἴσασι διὰ τὸ χαλεπὰ εἶναι γνῶναι, ταῦτα λέοντα, ἢ πάρδαλιν ἤ τινα κάπρον φάναι εἰδέναι· ἀλλ' ἀνάγκη ὁμοίως λέοντα καὶ ἔλαφον καὶ ταῦρον καὶ πίθηκον πρὸς ἀνδρείαν φάναι πεφυκέναι τὸν τιθέμενον ἀνδρείαν τοῦθ' ὅπερ σὺ τίθεσαι.

2. Indicate the general plan of the dialogue and give an outline of the course of the argument.

3. Translate into Greek:—

When we reached home, we began to discuss the nature of virtue. And Pearson was of opinion that one might define it as the giving up of one's own interests. But Mansel asked "Is it then virtue, if a man deliberately die of hunger?" Of course all agreed not. And Pearson then said, "I mean, to give up one's own interests for the benefit of another." "But," asked Mansel, "if the one for whom one gives up is a thief, or a drunkard, or a worthless man of any sort, what then? Is it still virtuous to give up one's own welfare on his behalf?" After some discussion, all agreed that one ought to consider the comparative worthiness of the two, so that at last virtue appeared to be as Bentham long ago said, nothing but the greatest happiness of the greatest number.

CLASSICAL HONOURS.

THIRD YEAR.

PRIVATE READINGS.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

A.—SOPHOCLES, ANTIGONE.

Translate, with notes on words and phrases underlined:—

(1) οὐ γὰρ τάφου νῷν τὼ κασιγνήτω Κρέων
τὸν μὲν προτίσας, τὸν δ' ἀτιμάσας ἔχει;
Ἐτεοκλέα μέν, ὡς λέγουσι, σὺν δίκης
*χρήσει δικαίᾳ καὶ νόμου κατὰ χθονὸς
ἔκρυψε τοῖς ἔνερθεν ἔντιμον νεκροῖς·

(2) καὶ φθέγμα καὶ ἀνεμόεν
φρόνημα καὶ ἀστυνόμους ὀργὰς ἐδιδάξατο, καὶ δυσαύλων
πάγων ἐναίθρεια καὶ δύσομβρα φεύγειν βέλη,
παντοπόρος· ἄπορος ἐπ' οὐδὲν ἔρχεται
τὸ μέλλον· Ἄιδα μόνον φεῦξιν οὐκ ἐπάξεται·
νόσων δ' ἀμηχάνων φυγὰς ξυμπέφρασται.

(3) ΚΡ. κλαίων φρενώσεις, ὧν φρενῶν αὐτὸς κενός.
ΑΙ. εἰ μὴ πατὴρ ἦσθ', εἶπον ἄν σ' οὐκ εὖ φρονεῖν.
ΚΡ. γυναικὸς ὢν δούλευμα μὴ κώτιλλέ με.
ΑΙ. βούλει λέγειν τι καὶ λέγων μηδὲν κλύειν.
ΚΡ. ἄληθες; ἀλλ' οὐ τόνδ' Ὄλυμπον, ἴσθ' ὅτι,
χαίρων ἐπὶ ψόγοισι δεννάσεις ἐμέ.

(4) παρὰ δὲ Κυανεᾶν *πελάγει διδύμας ἁλὸς
*ἀκτᾷ Βοσπορίᾳ ἵδ' ὁ Θρῃκῶν <κλήζεται>
Σαλμυδησσός, ἵν' ἀγχίπολις Ἄρης
δισσοῖσι Φινεΐδαις
εἶδεν ἀρατὸν ἔλκος
τυφλωθὲν ἐξ ἀγρίας δάμαρτος
ἀλαὸν ἀλαστόροισιν ὀμμάτων κύκλοις,
*ἀραχθέντων ὑφ' αἱματηραῖς
χείρεσσι καὶ κερκίδων ἀκμαῖσιν.

(5) *καὶ τὸν μέν, αἰτήσαντες ἐνοδίαν θεὸν*
Πλούτωνά τ' ὀργὰς εὐμενεῖς κατασχεθεῖν,
λούσαντες ἁγνὸν λουτρόν, ἐν νεοσπάσιν
θαλλοῖς ὃ δὴ 'λέλειπτο συγκατῄθομεν,
καὶ τύμβον ὀρθόκρανον οἰκείας χθονὸς
χώσαντες, αὖθις πρὸς λιθόστρωτον κόρης
νυμφεῖον Ἅιδου κοῖλον εἰσεβαίνομεν.
φωνῆς δ' ἄπωθεν ὀρθίων κωκυμάτων
κλύει τις ἀκτέριστον ἀμφὶ παστάδα,
καὶ δεσπότῃ Κρέοντι σημαίνει μολών.

B.—THUCYDIDES VI.

Translate, with notes on words and phrases underlined:—

(1) *καὶ μὴ ὑμᾶς ἡ Νικίου τῶν λόγων ἀπραγμοσύνη καὶ διάστασις τοῖς νέοις ἐς τοὺς πρεσβυτέρους ἀποτρέψῃ, τῷ δὲ εἰωθότι κόσμῳ, ὥσπερ καὶ οἱ πατέρες ἡμῶν ἅμα νέοι γεραιτέροις βουλεύοντες ἐς τάδε ἦραν αὐτά, καὶ νῦν τῷ αὐτῷ τρόπῳ πειρᾶσθε προαγαγεῖν τὴν πόλιν, καὶ νομίσατε νεότητα μὲν καὶ γῆρας ἄνευ ἀλλήλων μηδὲν δύνασθαι, ὁμοῦ δὲ τό τε φαῦλον καὶ τὸ μέσον καὶ τὸ πάνυ ἀκριβὲς ἂν ξυγκραθὲν μάλιστ' ἂν ἰσχύειν.*

(2) *ξυγκατέβη δὲ καὶ ὁ ἄλλος ὅμιλος ἅπας ὡς εἰπεῖν ὁ ἐν τῇ πόλει καὶ ἀστῶν καὶ ξένων, οἱ μὲν ἐπιχώριοι τοὺς σφετέρους αὐτῶν ἕκαστοι προπέμποντες, οἱ μὲν ἑταίρους, οἱ δὲ ξυγγενεῖς, οἱ δὲ υἱεῖς, καὶ μετ' ἐλπίδος τε ἅμα ἰόντες καὶ ὀλοφυρμῶν, τὰ μὲν ὡς κτήσοιντο, τοὺς δ' εἴ ποτε ὄψοιντο, ἐνθυμούμενοι ὅσον πλοῦν ἐκ τῆς σφετέρας ἀπεστέλλοντο.*

(3) *καὶ δέδοικα μέντοι μήποτε πολλὰ πειρῶντες καὶ κατορθώσωσιν· ἡμεῖς δὲ κακοί πρὶν ἐν τῷ παθεῖν ὦμεν προφυλάξασθαί τε καὶ αἰσθόμενοι ἐπεξελθεῖν. τοιγάρτοι δι' αὐτὰ ἡ πόλις ἡμῶν ὀλιγάκις μὲν ἡσυχάζει, στάσεις δὲ πολλὰς καὶ ἀγῶνας οὐ πρὸς τοὺς πολεμίους πλείονας ἢ πρὸς αὑτὴν ἀναιρεῖται, τυραννίδας δὲ ἔστιν ὅτε καὶ δυναστείας ἀδίκους.*

(4) *Ἐτείχιζον δὲ καὶ οἱ Συρακόσιοι ἐν τῷ χειμῶνι πρός τε τῇ πόλει, τὸν Τεμενίτην ἐντὸς ποιησάμενοι, τεῖχος παρὰ πᾶν τὸ πρὸς τὰς Ἐπιπολὰς ὁρῶν, ὅπως μὴ δι' ἐλάσ-*

σονος εὐαποτείχιστοι ὦσιν, ἦν ἄρα σφάλλωνται, καὶ τὰ Μέγαρα φρούριον καὶ ἐν τῷ Ὀλυμπιείῳ ἄλλο· καὶ τὴν θάλασσαν προεσταύρωσαν πανταχῆ ᾗ ἀποβάσεις ἦσαν.

Draw explanatory map.

(5) ἡμεῖς δὲ τοῦ ξύμπαντος προέστημεν, δικαιοῦντες ἐν ᾧ σχήματι μεγίστη ἡ πόλις ἐτύγχανε καὶ ἐλευθερωτάτη οὖσα καὶ ὅπερ ἐδέξατό τις, τοῦτο ξυνδιασῴζειν. ἐπεὶ δημοκρατίαν γε καὶ ἐγιγνώσκομεν οἱ φρονοῦντές τι (καὶ αὐτὸς οὐδενὸς ἂν χεῖρον, ὅσῳ κἂν λοιδορήσαιμι· ἀλλὰ περὶ ὁμολογουμένης ἀνοίας οὐδὲν ἂν καινὸν λέγοιτο) καὶ τὸ μεθιστάναι αὐτὴν οὐκ ἐδόκει ἡμῖν ἀσφαλὲς εἶναι ὑμῶν πολεμίων προσκαθημένων.

C.—Plato, Purves's Selections.

Translate, with notes on words and phrases underlined indicating also connection with context:—

(1) διδάσκων οὖν με τό τε φάρμακον καὶ τὰς ἐπῳδάς, Ὅπως, ἔφη, τῷ φαρμάκῳ τούτῳ μηδείς σε πείσει τὴν αὐτοῦ κεφαλὴν θεραπεύειν, ὃς ἂν μὴ τὴν ψυχὴν πρῶτον παράσχῃ τῇ ἐπῳδῇ ὑπὸ σοῦ θεραπευθῆναι. καὶ γὰρ νῦν, ἔφη, τοῦτ' ἔστι τὸ ἁμάρτημα περὶ τοὺς ἀνθρώπους, ὅτι χωρὶς ἑκατέρου ἰατροί τινες ἐπιχειροῦσιν εἶναι. καί μοι πάνυ σφόδρα ἐνετέλλετο μήτε πλούσιον οὕτω μηδένα εἶναι μήτε γενναῖον μήτε καλόν, ὃς ἐμὲ πείσει ἄλλως ποιεῖν.

(2) εἰ δὲ μή, ὅρα, ὦ μακάριε, μὴ περὶ τοῖς φιλτάτοις κυβεύῃς τε καὶ κινδυνεύῃς. καὶ γὰρ δὴ καὶ πολὺ μείζων κίνδυνος ἐν τῇ τῶν μαθημάτων ὠνῇ ἢ ἐν τῇ τῶν σιτίων. σιτία μὲν γὰρ καὶ ποτὰ πριάμενον παρὰ τοῦ καπήλου καὶ ἐμπόρου ἔξεστιν ἐν ἄλλοις ἀγγείοις ἀποφέρειν, καὶ πρὶν δέξασθαι αὐτὰ εἰς τὸ σῶμα πιόντα ἢ φαγόντα, καταθέμενον οἷ καδε ἔξεστι συμβουλεύσασθαι, παρακαλέσαντα τὸν ἐπαΐοντα, ὅ τι τε ἐδεστέον ἢ ποτέον καὶ ὅ τι μή, καὶ ὁπόσον καὶ ὁπότε· ὥστε ἐν τῇ ὠνῇ οὐ μέγας ὁ κίνδυνος.

(3) ἢ οὕτως εἶ σοφός, ὥστε λέληθέ σε ὅτι μητρός τε καὶ πατρὸς καὶ τῶν ἄλλων προγόνων ἁπάντων τιμιώτερόν ἐστιν ἡ πατρὶς καὶ σεμνότερον καὶ ἁγιώτερον καὶ ἐν μείζονι μοίρᾳ καὶ παρὰ θεοῖς καὶ παρ' ἀνθρώποις τοῖς νοῦν ἔχουσι,

καὶ σέβεσθαι δεῖ καὶ μᾶλλον ὑπείκειν καὶ θωπεύειν πατρίδα χαλεπαίνουσαν ἢ πατέρα, καὶ ἢ πείθειν ἢ ποιεῖν ἃ ἂν κελεύῃ, καὶ πάσχειν, ἐάν τι προστάττῃ παθεῖν, ἡσυχίαν ἄγοντα.

(4) καὶ κινδυνεύουσι καὶ οἱ τὰς τελετὰς ὑμῖν οὗτοι καταστήσαντες οὐ φαῦλοί τινες εἶναι, ἀλλὰ τῷ ὄντι πάλαι αἰνίττεσθαι ὅτι ὃς ἂν ἀμύητος καὶ ἀτέλεστος εἰς Ἅιδου ἀφίκηται, ἐν βορβόρῳ κείσεται, ὁ δὲ κεκαθαρμένος τε καὶ τετελεσμένος ἐκεῖσε ἀφικόμενος μετὰ θεῶν οἰκήσει. εἰσὶ γὰρ δή, φασὶν οἱ περὶ τὰς τελετάς, ναρθηκοφόροι μὲν πολλοί, βάκχοι δέ τε παῦροι· οὗτοι δ' εἰσὶ κατὰ τὴν ἐμὴν δόξαν οὐκ ἄλλοι ἢ οἱ πεφιλοσοφηκότες ὀρθῶς.

(5) αἱ δὲ δὴ ἄλλαι γλιχόμεναι μὲν ἅπασαι τοῦ ἄνω ἔπονται, ἀδυνατοῦσαι δὲ ὑποβρύχιαι ξυμπεριφέρονται, πατοῦσαι ἀλλήλας καὶ ἐπιβάλλουσαι, ἑτέρα πρὸ τῆς ἑτέρας πειρωμένη γενέσθαι. θόρυβος οὖν καὶ ἅμιλλα καὶ ἱδρὼς ἔσχατος γίγνεται. οὗ δὴ κακίᾳ ἡνιόχων πολλαὶ μὲν χωλεύονται, πολλαὶ δὲ πολλὰ πτερὰ θραύονται· πᾶσαι δέ, πολὺν ἔχουσαι πόνον, ἀτελεῖς τῆς τοῦ ὄντος θέας ἀπέρχονται, καὶ ἀπελθοῦσαι τροφῇ δοξαστῇ χρῶνται.

CLASSICAL HONOURS.

THIRD AND FOURTH YEARS.

PINDAR.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

Translate with notes on words and phrases underlined.

(a) ἔχει δ' ἀπάλαμον βίον τοῦτον ἐμπεδόμοχθον,
μετὰ τριῶν τέταρτον πόνον, ἀθανάτων ὅτι κλέψαις
ἁλίκεσσι συμπόταις
νέκταρ ἀμβροσίαν τε
δῶκεν, οἷσιν ἄφθιτον
ἔθεσαν. εἰ δὲ θεὸν ἀνήρ τις ἔλπεται λελαθέμεν
ἔρδων, ἁμαρτάνει.

Mss. Σέσαν αὐτόν. λαθέμεν.

(*b*) ἴσαις δὲ νύκτεσσιν αἰεί
ἶσον ἐν ἀμέραις ἄλιον ἔχοντες, ἀπονέστερον
ἐσλοὶ δέκονται βίοτον, οὐ χθόνα ταράσσοντες ἐν
χερὸς ἀκμᾷ
οὐδὲ πόντιον ὕδωρ
κεινὰν παρὰ δίαιταν· ἀλλὰ παρὰ μὲν τιμίοις
θεῶν, οἵτινες ἔχαιρον εὐορκίαις, ἄδακρυν νέμονται
αἰῶνα· τοὶ δ' ἀπροσόρατον ὀκχέοντι πόνον.
ὅσοι δ' ἐτόλμασαν ἐστρίς
ἑκατέρωθι μείναντες ἀπὸ πάμπαν ἀδίκων ἔχειν
ψυχάν, ἔτειλαν Διὸς ὁδὸν παρὰ Κρόνου τύρσιν·

Mss. ἴσαις δὲ νύκτεσσιν αἰεί, ἴσαις δ' ἐν ἀμέραις.

(*c*) ἀλλά κέκρυπτο γὰρ σχοίνῳ βατίᾳ τ' ἐν ἀπειρίτῳ,
ἴων ξανθαῖσι καὶ παμπορφύροις ἀκτῖσι βεβρεγμένος
ἀβρόν
σῶμα· τὸ καὶ κατεφάμιξεν καλεῖσθαι νιν χρόνῳ
σύμπαντι μάηρ
τοῦτ' ὄνυμ' ἀθάνατον. τερπνᾶς δ' ἐπεὶ χρυσοστε-
φάνοιο λάβεν
καρπὸν Ἥβας, Ἀλφεῷ μέσσῳ καταβὰς ἐκάλεσσε
Ποσειδᾶν' εὐρυβίαν,
ὃν πρόγονον, καὶ τοξοφόρον Δάλου θεοδμάτας σκοπόν,
αἰτέων λαοτρόφον τιμάν τιν' ἑᾷ κεφαλᾷ,
νυκτὸς ὑπαίθριος. ἀντεφθέγξατο δ' ἀρτιεπὴς
πατρία ὅσσα, μετάλλασέν τέ νιν· Ὄρσο, τέκος,
δεῦρο πάγκοινον ἐς χώραν ἴμεν φάμας ὄπισθεν.

(*d*) ἐπὶ πὰν βαίνει τι καὶ λάθας ἀτέκμαρτα νέφος,
καὶ παρέλκει πραγμάτων ὀρθὰν ὁδόν
ἔξω φρενῶν.
καὶ τοὶ γὰρ αἰθούσσας ἔχοντες σπέρμ' ἀνέβαν φλο-
γὸς οὔ· τεῦξαν δ' ἀπύροις ἱεροῖς
ἄλσος ἐν ἀκροπόλει. κείνοις ὁ μὲν ξανθὰν ἀγαγὼν
νεφέλαν
πολὺν ὗσε χρυσόν· αὐτὰ δέ σφισιν ὤπασε τέχναν
πᾶσαν ἐπιχθονίων Γλαυκῶπις ἀριστοπόνοις χερσὶ
κρατεῖν.
ἔργα δὲ ζωοῖσιν ἐρπόντεσσί θ' ὁμοῖα κέλευθοι φέρον·
ἦν δὲ κλέος βαθύ. δαέντι δὲ καὶ σοφία μείζων
ἄδολος τελέθει.

Mss. κείνοισι μέν.

(e) καιρὸν εἰ φθέγξαιο, πολλῶν πείρατα συντανύ-
αις
ἐν βραχεῖ, μείων ἔπεται μῶμος ἀνθρώπων, ἀπ-
γὰρ
κόρος ἀμβλύνει
αἰανὴς ταχείας ἐλπίδας·
ἀστῶν δ' ἀκοὰ κρύφιον θυμὸν βαρύνει μάλιστ'
ἐσλοῖσιν ἐπ' ἀλλοτρίοις.
ἀλλ' ὅμως, κρέσσων γὰρ οἰκτιρμοῦ φθόνος,
μὴ παρίει καλά. νώμα δικαίῳ πηδαλίῳ στρατόν·
ἀψευδεῖ δὲ πρὸς ἄκμονι χάλκευε γλῶσσαν.
εἴ τι καὶ φλαῦρον παραιθύσσει, μέγα τοι φέρεται
παρ σέθεν. πολλῶν ταμίας ἐσσί· πολλοὶ μάρτυρες
ἀμφοτέροις πιστοί.

(f) ἄμαχον κακὸν ἀμφοτέροις διαιβολιᾶν ὑποφάτιες,
ὀργαῖς ἀτενὲς ἀλωπέκων ἴκελοι.
κερδοῖ δὲ τί μάλα τοῦτο κερδαλέον τελέθει;
ἅτε γὰρ εἰνάλιον πόνον ἐχοίσας βαθύ
σκευᾶς ἑτέρας, ἀβάπτιστός εἰμι, φελλὸς ὣς ὑπὲρ
ἕρκος ἅλμας.
ἀδύνατα δ' ἔπος ἐκβαλεῖν κραταιὸν ἐν ἀγαθοῖς
δόλιον ἀστόν· ὅμως μὰν σαίνων ποτὶ πάντας ἄγαν
πάγχυ διαπλέκει.

οὔ οἱ μετέχω θράσεος. φίλον εἴη φιλεῖν·
ποτὶ δ' ἐχθρὸν ἅτ' ἐχθρὸς ἐὼν λύκοιο δίκαν ὑπο-
θεύσομαι,
ἄλλ' ἄλλοτε πατέων ὁδοῖς σκολιαῖς.
ἐν πάντα δὲ νόμον εὐθύγλωσσος ἀνὴρ προφέρει.

(g) ὁ δ' ἆρα χρόνῳ
ἵκετ' αἰχμαῖσιν διδύμαισιν ἀνὴρ ἔκπαγλος· ἐσθὰς
δ' ἀμφότερόν νιν ἔχεν,
ἅ τε Μαγνήτων ἐπιχώριος ἁρμόζοισα θαητοῖσι γυίοις,
ἀμφὶ δὲ παρδαλέᾳ στέγετο φρίσσοντας ὄμβρους·
οὐδὲ κομᾶν πλόκαμοι κερθέντες ᾖχον' ἀγλαοί,
ἀλλ' ἅπαν νῶτον καταίθυσσον. τάχα δ' εὐθὺς ἰὼν
σφετέρας
ἐστάθη γνώμας ἀταρμύκτοιο πειρώμενος
ἐν ἀγορᾷ πλήθοντος ὄχλου.

Mss. ἀταρβάκτοιο.

(*h*) εἰ δ' ἀρετῇ κατάκειται πᾶσαν ὀργάν,
ἀμφότερον δαπάναις τε καὶ πόνοις,
χρή νιν εὑρόντεσσιν ἀγάνορα κόμπον
μὴ φθονεραῖσι φέρειν
γνώμαις· ἐπεὶ κούφα δόσις ἀνδρὶ σοφῷ
ἀντὶ μόχθων παντοδαπῶν, ἔπος εἰπόντ' ἀγαθὸν ξυνὸν ὀρθῶσαι καλόν.
μισθὸς γὰρ ἄλλοις ἄλλος ἐφ' ἔργμασιν ἀνθρώποις γλυκύς,
μηλοβότᾳ τ' ἀρότᾳ τ' ὀρνιχολόχῳ τε καὶ δν πόντος τράφει.
γαστρὶ δὲ πᾶς τις ἀμύνων λιμὸν αἰανῆ τέτατα·

2. Comment on:

(*a*) ἐν δὲ Πυθῶνι χρησθὲν παλαίφατον τέλεσσεν.

(*b*) ἑπτὰ δ' ἔπειτα πυρᾶν νεκρῶν τελεσθέντων Ταλαιονίδας εἶπεν.... ....

(*c*) ὄφρα κελεύθῳ τ' ἐν καθαρᾷ
βάσομεν ὄκχον, ἵκωμαί τε πρὸς ἀνδρῶν καὶ γένος.

(*d*) Φοίβου γὰρ αὐτὸν φᾶ γεγάκειν πατρός.

(*e*) μνασθέντι δὲ Ζεὺς ἀμ πάλου μέλλεν θέμεν.

(*f*) εἰ δὲ σὺν πόνῳ τις εὖ πράσσῃ, μελιγάρυες ὕμνοι
ὑστέρων ἀρχὰ λόγων τέλλεται

(*g*) ἔλπομαι μὴ χαλκοπάραον ἄκονθ' ὡσείτ' ἀγῶνος
βαλεῖν ἔξω παλάμᾳ δονέων,
μακρὰ δὲ ῥίψαις ἀμεύσεσθ' ἀντίους.

(*h*) χρὴ δὲ πρὸς θεὸν οὐκ ἐρίζειν.

(*i*) ἔνθ' ἁγνὸν Ποσειδάωνος ἔσσαντ' εἰναλίου τέμενος.

3. Discuss the following MS. readings:—

(*a*) τραπέζαισί τ' ἀμφιδεύτατα κρεῶν
σέθεν διεδάσαντο καὶ φάγον.

(*b*) Θήρωνα δὲ τετραορίας ἕνεκα νικαφόρου
γεγωνητέον, ὅπιν δίκαιον ξένων.

(*c*) τὰ γλυκέα γίνεται πάντα βροτοῖς
(= ἐν μελέταις τ' ἀείδων ἔμολον)

(*d*) εὐναὶ δὲ παράτροποι ἐς κακότατ' ἀθρόαν
ἔβαλον ποτὶ καὶ τὸν ἵκοντ', ἐπεὶ.....

(*e*) οὐδ' ἀπίθησέ νιν, ἀλλ' ἥρως.....

(*f*) Αἴσονος γὰρ παῖς ἐπιχώριος οὐ ξείναν ἰκόμαν γαῖαν ἄλλων.

(where for *ἰκόμαν* is wanted ∪ — —)

4. Discuss Pindar's treatment of the myth, indicating some of the various ways in which it is related to the main subject.

5. Make a short list of the chief normal differences between Pindar and Attic prose in Accidence and Syntax.

CLASSICAL HONOURS.

THIRD AND FOURTH YEARS.

PLATO, FORMAN'S SELECTIONS.

TUESDAY, APRIL 21ST, 1903:—MORNING, 9 TO 12.

1. Translate, with notes on words and phrases underlined, indicating also, except in (9), connection with the context:—

(*a*) εὐθὺς οὖν με ἰδὼν ὁ Κέφαλος ἠσπάζετό τε καὶ εἶπεν Ὦ Σώκρατες, οὐ δὲ θαμίζεις ἡμῖν καταβαίνων εἰς τὸν Πειραιᾶ· χρῆν μέντοι· εἰ μὲν γὰρ ἐγὼ ἔτι ἐν δυνάμει ἦν τοῦ ῥᾳδίως πορεύεσθαι πρὸς τὸ ἄστυ, οὐδὲν ἂν σε ἔδει δεῦρο ἰέναι, ἀλλ' ἡμεῖς ἂν παρὰ σὲ ἤμεν· νῦν δέ σε χρὴ πυκνότερον δεῦρο ἰέναι.

(*b*) ἔστι δὲ τοῦτο τυραννίς, ἢ οὐ κατὰ σμικρὸν τἀλλότρια καὶ λάθρᾳ καὶ βίᾳ ἀφαιρεῖται, καὶ ἱερὰ καὶ ὅσια καὶ ἴδια καὶ δημόσια, ἀλλὰ ξυλλήβδην· ὧν ἐφ' ἑκάστῳ μέρει ὅταν τις ἀδικήσας μὴ λάθῃ, ζημιοῦταί τε καὶ ὀνείδη ἔχει τὰ μέγιστα· καὶ γὰρ ἱερόσυλοι καὶ ἀνδραποδισταὶ καὶ τοιχωρύχοι καὶ ἀποστερηταὶ καὶ κλέπται οἱ κατὰ μέρη ἀδικοῦντες τῶν τοιούτων κακουργημάτων καλοῦνται· ἐπειδὰν δέ τις πρὸς τοῖς τῶν πολιτῶν χρήμασιν καὶ αὐτοὺς ἀνδραποδισάμενος δουλώσηται, ἀντὶ τούτων τῶν αἰσχρῶν ὀνομάτων εὐδαίμονες καὶ μακάριοι κέκληνται.

(*c*) ὁ γὰρ νέος οὐχ οἷόστε κρίνειν ὅ τι τε ὑπόνοια καὶ ὃ μή, ἀλλ' ἃ ἂν τηλικοῦτος ὢν λάβῃ ἐν ταῖς δόξαις, δυσέκνιπτά τε καί ἀμετάστατα φιλεῖ γίγνεσθαι. ὧν δὴ

ἴσως ἕνεκα περὶ παντὸς ποιητέον, ἃ πρῶτα ἀκούουσιν ὅτι κάλλιστα μεμυθολογημένα πρὸς ἀρετὴν ἀκούειν.

(*d*) Τίνα οὖν ἄλλον σοφιστὴν οἴει ἢ ποίους ἰδιωτικοὺς λόγους ἐναντία τούτοις τείνοντας κρατήσειν; Οἶμαι μὲν οὐδένα, ἦ δ' ὅς. Οὐ γάρ, ἦν δ' ἐγώ, ἀλλὰ καὶ τὸ ἐπιχειρεῖν πολλὴ ἄνοια. οὔτε γὰρ γίγνεται οὔτε γέγονεν οὐδὲ οὖν μὴ γένηται ἀλλοῖον ἦθος πρὸς ἀρετὴν παρὰ τὴν τούτων παιδείαν πεπαιδευμένον, ἀνθρώπειον, ὦ ἑταῖρε. θεῖον μέντοι κατὰ τὴν παροιμίαν ἐξαιρῶμεν λόγου.

(*e*) Τί δέ; ἡ πραότης ἐνίων τῶν δικασθέντων οὐ κομψή; ἢ οὕπω εἶδες ἐν τοιαύτῃ πολιτείᾳ, ἀνθρώπων καταψηφισθέντων θανάτου ἢ φυγῆς οὐῆνὲδττον αὐτῶν μενόντων τε καὶ ἀναστρεφομένων ἐν μέσῳ, καὶ ὡς οὔτε φροντίζοντος οὔτε ὁρῶντος οὐδενὸς περινοστεῖ ὥσπερ ἥρως; Καὶ πολλούς γ', ἔφη.

(*f*) ταῦτα εἰπόντα ῥῖψαι ἐπὶ πάντας τοὺς κλήρους. τὸν δὲ παρ' αὐτὸν πεσόντα ἕκαστον ἀναιρεῖσθαι, πλὴν οὗ, ἃ δὲ οὐκ ἐᾶν· τῷ δὲ ἀνελομένῳ δῆλον εἶναι, ὁπόστος εἰλήχειν· μετὰ δὲ τοῦτο αὖθις τὰ τῶν βίων παραδείγματα εἰς τὸ πρόσθεν σφῶν θεῖναι ἐπὶ τὴν γῆν, πολὺ πλείω τῶν παρόντων, εἶναι δὲ παντοδαπά· ζῴων τε γὰρ πάντων βίους καὶ δὴ καὶ τοὺς ἀνθρωπίνους ἅπαντας. τυραννίδας τε γὰρ ἐν αὐτοῖς εἶναι, τὰς μὲν διατελεῖς, τὰς δὲ καὶ μεταξὺ διαφθειρομένας καὶ εἰς πενίας τε καὶ φυγὰς καὶ εἰς πτωχείας τελευτώσας.

(*g*) ΣΩ. Ἄθρει δὴ περισκοπῶν, μή τις τῶν ἀμυήτων ἐπακούῃ. εἰσὶν δὲ οὗτοι οἱ οὐδὲν ἄλλο οἰόμενοι εἶναι ἢ οὗ ἂν δύνωνται ἁπρὶξ τοῖν χεροῖν λαβέσθαι, πράξεις δὲ καὶ γενέσεις καὶ πᾶν τὸ ἀόρατον οὐκ ἀποδεχόμενοι ὡς ἐν οὐσίας μέρει.

ΘΕΑΙ. Καὶ μὲν δή, ὦ Σώκρατες, σκληρούς γε λέγεις καὶ | ἀντιτύπους ἀνθρώπους.

ΣΩ. Εἰσὶν γάρ, ὦ παῖ, μάλ' εὖ ἄμουσοι.

2. Comment on:—

(*a*) ὡς τοίνον μὴ ἀκουσομένων, οὕτω διανοεῖσθε.

(*b*) οἱ δ' ἀρχόμενοι ποιοῦσιν τὸ ἐκείνου ξύμφερον κρείττονος ὄντος.

(*c*) τοὺς ἐπιτυχόντας ὑπὸ τῶν ἐπιτυχόντων μύθους πλασθέντας.

(*d*) Παραδείγματος ἄρα ἕνεκα, ἦν δ' ἐγώ, ἐζητοῦμεν αὐτό τε δικαιοσύνην οἷόν ἐστι, καὶ ἄνδρα τὸν τελέως δίκαιον.

(*e*) ἐν γυναιξὶ δὲ πρὸς ἄνδρας καὶ ἀνδράσι πρὸς γυναῖκας ὅση ἡ ἰσονομία καὶ ἐλευθερία γίγνεται, ὀλίγου ἐπελαθόμεθ' εἰπεῖν.

(*f*) καὶ ἀναλώσει τῆς οὐσίας καθ' ὅσον ἂν οἷός τ' ᾖ.

(*g*) τῶν δὲ εὐθὺς γενομένων καὶ ὀλίγον χρόνον βιούντων πέρι ἄλλα ἔλεγεν οὐκ ἄξια μνήμης.

(*h*) Οὐχ ἥκει, φάναι, οὐδ' ἂν ἥξει δεῦρο.

3. Explain the general scheme of the "Republic." Criticize the model state from the point of view of modern political theory.

4. In what connection are the following mentioned:—Agamemnon, Achelous, Thamyras, Niobe, Pandarus.

THIRD AND FOURTH YEARS.

CLASSICAL HONOURS.

THURSDAY, APRIL 16TH, 1903:—AFTERNOON, 2 TO 5.

1. Translate:—

(*a*) Τί οὖν ἔσθ' ὃ πέπονθε; Μεγάλην νὴ Δί' ὤφλε δίκην καὶ τοσαύτην ὥστ' ἀποστερεῖσθαι τῶν ὄντων. ἀλλὰ χιλίων ἡ δίκη μόνον ἦν δραχμῶν. Πάνυ γε· ἀλλὰ δάκνει καὶ τοῦτο φαίη τις ἂν ὅταν ἐκτίνειν ἀδίκως δέῃ· συνέβη δὲ ὑπερημέρῳ γενομένῳ λαθεῖν αὐτῷ διὰ τὸ ἀδικηθῆναι. ἀλλ' αὐθημερὸν μὲν ᾔσθετο· ὃ καὶ μέγιστόν ἐστι τεκμήριον τοῦ μηδὲν ἠδικηκέναι τὸν ἄνθρωπον· δραχμὴν δ' οὐδέπω μιαν ἐκτέτικεν. ἀλλὰ μήπω τοῦτο. ἀλλὰ τὴν μὴ οὖσαν ἀντιλαχεῖν αὐτῷ ἐξῆν δήπου καὶ πρὸς ἐμὲ τὸ πρᾶγμα καταστήσασθαι πρὸς ὅντινα ἐξ ἀρχῆς ἦν ἡ δίκη. ἀλλ' οὐκ ἠβούλετο.

(*b*) Καὶ εἰ μὴ Τηλεφάνης ὁ αὐλητὴς ἀνδρῶν βέλτιστος περὶ ἐμὲ τότε ἐγένετο καὶ τὸ πρᾶγμα αἰσθόμενος τὸν ἄνθρωπον ἀπελάσας αὐτὸς συγκροτεῖν καὶ διδάσκειν ὤετο δεῖν τὸν χορὸν, οὐδ' ἂν ἠγωνισάμεθα, ὦ ἄνδρες Ἀθηναῖοι·

ἀλλ' ἀδίδακτος ἂν εἰσῆλθεν ὁ χορὸς καὶ πράγματα ἄισχιστα ἂν ἐπάθομεν. καὶ οὐδ' ἐνταῦθ' ἔστιν τῆς ὕβρεως ἀλλὰ τοσοῦτον αὐτῷ περιῆν ὥστε τὸν ἐστεφανωμένον ἄρχοντα διέφθειρε· τοὺς χορηγοὺς συνῆγεν ἐπ' ἐμέ· βοῶν ἀπειλῶν ὀμνύουσι παρεστηκὼς τοῖς κριταῖς τὰ παρασκήνια φράττων, προσηλῶν, ἰδιώτης ὢν τὰ δημόσια κακὰ καὶ πράγματα ἀμύθητά μοι παρέχων διετέλεσε.

(*c*) Τοσούτων τοίνυν καὶ τοιούτων ὄντων ἃ τῷ βδελυρῷ τούτῳ καὶ ἀναιδεῖ βεβίωται, ἔνιοί μοι προσιόντες, ὦ ἄνδρες δικασταί, τῶν χρωμένων αὐτῷ, παραινοῦντες ἀπαλλαγῆναι καὶ καθυφεῖναι τὸν ἀγῶνα τουτονί, ἐπειδή με μὴ πείθοιεν, ὡς μὲν οὐ πολλὰ καὶ δεινὰ πεποίηκεν οὗτος καὶ δίκην ἠντινοῦν ἂν δοίη δικαίως τῶν πεπραγμένων οὐκ ἐτόλμων λέγειν, ἐπὶ ταῦτα δὲ ἀπήντων ὡς ἤλωκεν ἤδη καὶ κατεψήφισται. τίνος τιμήσειν αὐτῷ προσδοκᾶς τὸ δικαστήριον; οὐχ ὁρᾷς ὅτι πλουτεῖ καὶ τριηραρχίας ἐρεῖ καὶ λειτουργίας; σκόπει δὴ μὴ τούτοις αὐτὸν ἐξαιτήσηται καὶ ἐλάττω πολὺ τῇ πόλει καταθεὶς ἢ ὅσα σοι δίδωσι, καταγελάσῃ. ἐγὼ δὲ πρῶτον μὲν οὐδὲν ἀγεννὲς ὑμῶν καταγιγνώσκω οὐδ' ὑπολαμβάνω τιμήσειν οὐδενὸς ἐλάττονος τούτῳ ἢ ὅσον καταθεὶς οὑτωσὶ παύσεται τῆς ὕβρεως.

Add a note on the mood of *πείθοιεν*.

(*d*) Ἦν δ' οὗτος ὁ τοῦ βελτίστου πατὴρ Χαρικλείδου τοῦ ἄρξαντος καὶ μέγα γ' ὑμῖν τοῦτ' ἐδόκει δίκαιον ἔχειν ὁ προβαλλόμενος λέγειν· εἰ κατελάμβανον, ἄνθρωπε, θέαν, εἰ μὴ τοῖς κηρύγμασιν, ὡς σύ με φῂς, ἐπειθόμην, τίνος ἐκ τῶν νόμων εἶ κύριος καὶ ὁ ἄρχων αὐτός; τοῖς ὑπηρέταις ἐξεῖργειν εἰπεῖν, οὐκ αὐτὸς τύπτειν. οὐδ' οὕτω πείθομαι· ἐπιβολὴν ἐπιβάλλειν, πάντα μᾶλλον, πλὴν αὐτὸς ἅψασθαι τῇ χειρί. πολλὰ γὰρ πρὸ τοῦ μὴ τὸ σῶμα ἕκαστον ὑβρίζεσθαι πεποιήκασιν οἱ νόμοι.

2. Translate the following and add a word of comment or explanation where necessary:—

νύκτωρ, ἱρομηνία, πρόεδρος, σκότους (Gen.), *ἐξούλης, ἀγωνιῶντας, ἀπεδιήτησε, καταβραβευθέντα, κονιορτός, κέρματα, πρόσφατος, τετύφωσθε, ἀνηρπάσθαι, ἀσχάλλειν, ἔθνος, κύμβια, φθείρεσθαι πρὸς πλουσίους, Ὀλυμπίασιν, ἀντίδοσις, σκῦτος, ἐκλώζετε, ἔνη καὶ νέα, Σκιροφοριών.*

3. Compare the rules which Demosthenes observes for the rhythm of the final syllables of his sentences with those preferred by Cicero.

CLASSICAL HONOURS.

THIRD AND FOURTH YEARS.

TRANSLATION AT SIGHT.

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 5.

Translate into English:—

(1) ὡς δ' ὅτ' ἐν αἰγιαλῷ πολοηχέι κῦμα θαλάσσης
ὄρνυτ ἐπασσύτερον, Ζεφύρου ὕπο κινησαντος·
πόντῳ μέν τε πρῶτα κορύσσεται, αὐτὰρ ἔπειτα
χέρσῳ ῥηγνύμενον μεγάλα βρέμει, ἀμφὶ δέ τ' ἄκρας
κυρτὸν ἰὸν κορυφοῦται, ἀπoπτύει δ' ἁλὸς ἄχνην·
ὣς τοτ' ἐπασσύτεραι Δαναῶν κίνυντο φάλαγγες
νωλεμέως πόλεμόνδε. κέλευε δὲ οἷσιν ἕκαστος
ἡγεμόνων· οἱ δ' ἄλλοι ἀκὴν ἴσαν (οὐδέ κε φαίης
τόσσον λαὸν ἕπεσθαι ἔχοντ' ἐν στήθεσιν αὐδήν)
σιγῇ δειδίοτες σημάντορας· ἀμφὶ δὲ πᾶσιν
τεύχεα ποικίλ' ἔλαμπε, τὰ εἱμένοι ἐστιχόωντο.
Τρῶες δ', ὥστ' ὄιες πολυπάμονος ἀνδρὸς ἐν αὐλῇ
μυρίαι ἑστήκασιν ἀμελγόμεναι γάλα λευκόν,
ἀξηχὲς μεμακυῖαι, ἀκούουσαι ὅπα ἀρνῶν·
ὣς Τρώων ἀλαλητὸς ἀνὰ στρατὸν εὐρὺν ὀρώρει.

(2) ἔλθ' ὦ διὰ ξουθᾶν γενύων ἐλελιζομένα,
θρήνοις ἐμοῖς ζυνεργὸς,
Ἑλένας μελέας πόνους,
τὸν Ἰλιάδων τ' ἀει—
δούσᾳ δακρυόεντα πόνον
Ἀχαιῶν ὑπὸ λόγχαις,
ὅτ' ἔμολεν, ἔμολε πεδία βαρβάρῳ πλάτᾳ,
ὃς ἔδραμε ῥόθια, μέλεα Πριαμίδαις ἄγων
Λακεδαίμονος ἄπο λέχεα
σέθεν, ὦ Ἑλένα, Πάρις αἰνόγαμος
πομπαῖσιν Ἀφροδίτας.
πολλοὶ δ' Ἀχαιῶν ἐν δορὶ καὶ πετρίναις
ῥιπαῖσιν ἐκπνεύσαντες Ἄιδαν μέλεον ἔχουσιν,
τάλαιναν ὧν ἀλόχων κείραντες ἔθειραν.

(3) καὶ οὐκ ἂν μείζω πρὸς τοῖς ὅρκοις βεβαίωσιν λάβοιτε, ἢ οἷς τὰ ἔργα ἐκ τῶν λόγων ἀναθρούμενα δόκησιν ἀναγκαίαν παρέχεται ὡς καὶ ξυμφέρει ὁμοίως; ὡς εἶπον. εἰ

δ' ἐμοῦ ταῦτα προϊσχομένου ἀδύνατοι μὲν φήσετε εἶναι, εὖνοι δ' ὄντες ἀζιώσετε μὴ κακούμενοι διωθεῖσθαι καὶ τὴν ἐλευθερίαν μὴ ἀκίνδυνον ὑμῖν φαίνεσθαι, δίκαιόν τε εἶειν,, οἷς καὶ δυνατὸν δέχεσθαι αὐτὴν, τούτοις καὶ ἐπιφέρναι ἄκοντα δὲ μηδένα προσαναγκάζειν, μάρτυρας μὲν θεοὺς καὶ ἥρωας τοὺς ἐγχωρίους ποιήσομαι ὡς ἐπ' ἀγαθῷ ἥκων οὐ πείθω, γῆν δὲ τὴν ὑμετέραν δῄων πειράσομαι βιάζεσθαι.

(4) ἐγὼ μὲν οὖν, ὦ Καλλίκλεις, ὑπὸ τούτων τῶν λόγων πέπεισμαι, καὶ σκοπῶ ὅπως ἀποφανοῦμαι τῷ κρίτῃ ὡς ὑγιεστάτην τὴν ψυχήν· χάιρειν οὖν ἐάσας τὰς τίμας τὰς τῶν πολλῶν ἀνθρώπων, τὴν ἀλήθειαν σκοπῶν πειράσομαι τῷ ὄντι ὡς ἂν δύνωμαι βέλτιστος ὢν καὶ ζῆν καὶ ἐπειδὰν ἀποθνῄσκω ἀποθνῄσκειν. παρακαλῶ δὲ καὶ τοὺς ἄλλους πάντας ἀνθρώπους, καθ' ὅσον δύναμαι, καὶ δὴ καὶ σὲ ἀντιπαρακαλῶ ἐπὶ τοῦτον τὸν βίον καὶ τὸν ἀγῶνα τοῦτον, ὃν ἐγώ φημι ἀντὶ πάντων τῶν ἐνθάδε ἀγώνων εἶναι, καὶ ὀνειδίζω σο., ὅτι οὐχ οἷός τ' ἔσει σαυτῷ βοηθῆσαι, ὅταν ἡ δίκη σοι ᾖ καὶ ἡ κρίσις ἣν νυνδὴ ἐγὼ ἔλεγον, ἀλλὰ ἐλθὼν παρὰ τὸν δικαστὴν τὸν τῆς Αἰγίνης υἱόν, ἐπειδάν σου ἐπιλαβόμενος ἄγῃ, χασμήσει καὶ εἰλιγγιάσεις οὐδὲν ἧττον ἢ ἐγὼ ἐνθάδε σὺ ἐκεῖ, καί σε ἴσως τοπτήσει τις ἐπὶ κόρρης καὶ πάντως προπηλακιεῖ.

(5) καίτοι καὶ περὶ τῆς φωνῆς ισως εἰπεῖν ἀνάγκη πανυ γὰρ μέγα καὶ ἐπὶ ταύτῃ φρονεῖν αὐτὸν ἀκούω, ὡς καθυποκρινούμενον ὑμᾶς. ἐμοὶ δὲ δοκεῖτ' ἀτοπώτατον ἁπάντων ἂν ποιῆσαι, εἰ, ὅτε μὲν τὰ Θυέστου καὶ τῶν ἐπὶ Τροίᾳ κάκ' ἠγωνίζετο, ἐξεβάλλετ' αὐτὸν καὶ ἐξεσυρίττετ' ἐκ τῶν θεάτρων καὶ μόνον οὐ κατελεύετ' οὕτως, ὥστε τελευτῶντα τοῦ τριταγωνιστεῖν ἀποστῆναι, ἐπειδὴ δ' οὐκ ἐπὶ τῆς σκηνῆς ἀλλ' ἐν τοῖς κοινοῖς καὶ μεγίστοις τῆς πόλεως πράγμασι μυρί' εἴργασται κακὰ, τηνικαῦθ' ὡς καλὸν φθεγγομένᾳ προσέχοιτε. μηδαμῶς. μηδὲν ὑμεῖς ἀβέλτερον πάθητε, ἀλλὰ λογίζεσθ' ὅτι δεῖ κήρυκα μὲν ἂν δοκιμάζητε, εὔφωνον σκοπεῖν, πρεσβευτὴν δὲ καὶ τῶν κοινῶν ἀξιοῦντά τι πράττειν δίκαιον καὶ φρόνημ' ἔχονθ' ὑπὲρ ὑμῶν μέγα, πρὸς δ' ὑμᾶς ἴσον· ὥσπερ ἐγὼ Φίλιππον μὲν οὐκ ἐθαύμασα, τοὺς δ' αἰχμαλώτους ἐθαύμασα, ἔσωσα, οὐδὲν ὑπεστειλάμην. οὗτος δ' ἐκείνου μὲν προυκαλινδεῖτο καὶ τοὺς παιᾶνας ᾖδεν, ὑμῶν δ' ὑπερορᾷ.

(6) Πούλυτον ἀγρεύσας ποτὲ Τύννιχος, ἐξ ἁλὸς εἰς γῆν
ἔρριψεν, δείσας θηρὸς ἱμαντοπέδην.
ἀλλ' ὅγ' ἐφ' ὑπνώοντα πεσὼν συνέδησε λαγωόν,
φεῦ, τάχα θηρευτὰς ἄρτι φυγόντα κύνας.
ἀγρευθεὶς ἤγρευσεν. ὁ δ' εἰς ἅλα Τύννιχος ἰχθὸν
ἦκε πάλιν ζωὸν, λύτρα λαγωὸν ἔχων.

CLASSICAL HONOURS.

GREEK PROSE.

TUESDAY, APRIL 21ST, 1903:—AFTERNOON, 2 TO 5.

In discussing each particular transaction in the life of Charles as of any other Sovereign, it is required by the truth of history to spare no just animadversion upon his faults; especially where so much art has been employed by the writers most in repute to carry the stream of public prejudice in an opposite direction. But when we come to a general estimate of his character, we should act unfairly not to give their full weight to those peculiar circumstances of his condition in this wordly scene, which tend to account for and extenuate his failings. The station of kings is, in a moral sense, so unfavourable, that those who are least prone to servile admiration should be on their guard against the opposite error of an uncandid severity. There seems to be no fairer method of estimating the intrinsic worth of a sovereign than to treat him as a subject, and to judge, so far as the history of his life enables us what he would have been in that more private and happier condition, from which the chance of birth has excluded him.

CLASSICAL HONOURS.

FOURTH YEAR.

GREEK, PRIVATE READINGS (PROSE).

MONDAY APRIL 20TH, 1903:—AFTERNOON, 2 TO 5.

A.—HERODOTUS VII.

Translate:—

(1) ἐπειδὴ δὲ ἐγεφυρώθη ὁ πόρος, κορμοὺς ξύλωι καταπρίσαντες καὶ ποιήσαντες ἴσους τῆς σχεδιης τῷ εὔρει κόσμῳ ἐτιθεσαν κατύπερθε τῶν ὅπλων τοῦ τόνου, θέντες δὲ ἐπεξῆς ἐνθαῦτα αὖτις ἐπεζεύγνυον. ποιήσαντες δὲ ταῦτα ὕλην ἐπεφόρησαν, κόσμῳ δὲ θέντες καὶ τὴν ὕλνη τῆν ἐπεφόρησαν, κατανάξαντες δὲ καὶ τὴν γῆν φραγμὸν παρείρυσαν ἔνθεν καὶ ἔνθεν, ἵνα μὴ φοβέηται τὰ ὑποζύγια τὴν θάλασσαν ὑπερορῶντα [καὶ οἱ ἵπποι]. ὡς δὲ τά τε τῶν γεφυρέων κατεσκεύαστο καὶ τὰ περὶ τὸν Ἄθων, οἵ τε χυτοὶ περι τὰ στόματα τῆς διώρυχος, οἳ τῆς ῥηχίης εἵνεκεν ἐποιήθησαν, ἵνα μὴ πίμπληται τὰ στόματα τοῦ ὀρύγματος, καὶ αὐτὴ ἡ διῶρυξ παντελέως πεποιημένη ἀγγέλλετο, ἐνσαῦτα χειμερίσας ἅμα τῷ ἔαρι παρεσκευασμένος ὁ στρατὸς ἐκ τῶν Σαρδίων ὁρμᾶτο ἐλῶν ἐς Ἄβυδον.

(2) Οἱ δὲ στρατευόμενοι οἵδε ἦσαν, Πέρσαι μὲν ὧδε ἐσκευασμένοι· περὶ μὲν τῇσι κεφαλῇσι εἶχον τιάρας καλεομένους, πίλους ἀπαγέας, περὶ δὲ τὸ σῶμα κιθῶνας χειριδωτοὺς ποικίλους, λεπιδος σιδηρέης ὄψιν ἰχθυοειδέος. περὶ δὲ τὰ σκέλεα ἀναξυρίδας, ἀντὶ δὲ ἀσπίδων γέρρα· ὑπὸ δὲ φαρετρεῶνες ἐκρέμαντο· αἰχμὰς δὲ βραχέας εἶχον, τόξα δὲ μεγάλα, οἰστοὺς δὲ καλαμίνους, πρὸς δὲ ἐγχειρίδια παρὰ τὸν δεξιὸν μηρὸν παραιωρεύμενα ἐκ τῆς ζώνης.

(3) σὺ δὲ ἐπεὶ ἠνάγκασας λέγειν τῶν λόγων τοὺς ἀληθεστάτους, ἔλεγον τὰ κατήκοντα Σπαρτιήτῃσι. καίτοι ὡς ἐγὼ τυγχάνω τὰ νῦν τάδε ἐστοργὼς ἐκείνους, αὐτὸς μάλιστα ἐξεπίστεαι, οἵ με τιμήν τε καὶ γέρεα ἀπελόμενοι πατρώια ἄπολίν τε καὶ φυγάδα πεποιήκασι, πατὴρ δὲ σὸς ὑποδεξάμενος βίον τέ μοι καὶ οἶκον ἔδωκε. οὐκ ὢν οἰκός ἐστι ἄνδρα τὸν σώφρονα εὐνοίην φαινομένην δωθέεσθαι ἀλλὰ στέργειν μάλιστα.

(4) ἡ δὲ Αἰγιναίη τῆς ἐτριηράρχεε Ἀσωνίδης, καὶ τινά σφι θόρυβον παρέσχε Πυθέω τοῦ Ἰσχενόου ἐπιβατεύοντος, ἀνδρὸς ἀρίστου γενομένου ταύτην τὴν ἡμέρην· ὃς ἐπειδὴ ἡ νηῦς ἡλίσκετο ἐς τοῦτο ἀντεῖχε μαχόμενος ἐς ὃ κατεκρεουργήθη ἅπας. ὡς δὲ πεσὼν οὐκ ἀπέθανε ἀλλ' ἦν ἔμπνοος, οἱ Πέρσαι, οἵ περ ἐπεβάτευον ἐπὶ τῶν νεῶν, δι' ἀρετὴν τὴν ἐκείνου περιποιῆσαί μιν περὶ πλείστου ἐποιήσαντο, σμύρνῃσί τε ἰώμενοι τὰ ἕλκεα καὶ σινδόνος βυσσίνης τελαμῶσι κατειλίσσοντες· καί μιν ὡς ὀπίσω ἀπίκοντο ἐς τὸ ἑωυτῶν στρατόπεδον, ἐπεδείκνυσαν ἐκπαγλεόμενοι πάσῃ τῇ στρατιῇ, περιέποντες εὖ· τοὺς δὲ ἄλλους τοὺς ἔλαβον ἐν τῇ νηὶ ταύτῃ περιεῖπον ὡς ἀνδράποδα.

(5) ἦν δὲ λόγος οὐδεὶς τοῦ ἀπολλυμένου. ἅτε γὰρ ἐπιστάμενοι τὸν μέλλοντα σφίσι ἔσεσθαι θάνατον ἐκ τῶν περιιόντων τὸ ὄρος, ἀπεδείκνυντο ῥώμης ὅσον εἶχον μέγιστον ἐς τοὺς βαρβάρους, παραχρεώμενοί τε καὶ ἀτέοντες. δόρατα μέν νυν τοῖσι πλέοσι αὐτῶν τηνικαῦτα ἤδη ἐτύγχανε κατεηγότα, οἱ δὲ τοῖσι ξίφεσι διεργάζοντο τοὺς Πέρσας.

B.—Attic Orators.

Translate, with any necessary explanations:—

(1) αὐτῶν δὲ τούτων ἕνεκα οἵ τε νόμοι καὶ αἱ διωμοσίαι καὶ τὰ τόμια καὶ αἱ προρρήσεις, καὶ τἄλλα ὁπόσα γίγνεται τῶν δικῶν ἕνεκα τοῦ φόνου, πολὺ διαφέροντά ἐστιν ἢ ἐπὶ τοῖς ἄλλοις, ὅτι καὶ αὐτὰ τὰ πράγματα, περὶ πλείστου ἐστὶν ὀρθῶς γιγνώσκεσθαι· ὀρθῶς μὲν γὰρ γνωσθέντα τιμωρία ἐστὶ τῷ ἀδικηθέντι, φονέα δὲ τὸν μὴ αἴτιον ψηφισθῆναι ἁμαρτία καὶ ἀσέβειά ἐστιν εἴς τε τοὺς θεοὺς καὶ εἰς τοὺς νόμους. καὶ οὐκ ἴσον ἐστὶ τόν τε διώκοντα μὴ ὀρθῶς αἰτιάσασθαι καὶ ὑμᾶς τοὺς δικαστὰς μὴ ὀρθῶς γνῶναι. ἡ μὲν γὰρ τούτων αἰτίασις οὐκ ἔχει τέλος, ἀλλ' ἐν ὑμῖν ἐστι καὶ τῇ δίκῃ. ὅ τι δ' ἂν ὑμεῖς ἐν αὐτῇ τῇ δίκῃ μὴ ὀρθῶς γνῶτε, τοῦτο οὐκ ἔστιν ὅκοι ἄν τις ἀνενεγκὼν τὴν ἁμαρτίαν ἀπολύσαιτο.

(2) Ἔφη γὰρ εἶναι μὲν ἀνδράποδόν οἱ ἐπὶ Λαυρίῳ, δεῖν δὲ κομίσασθαι ἀποφοράν. ἀναστὰς δὲ πρῲ ψευσθεὶς τῆς ὥρας βαδίξειν· εἶναι δὲ πανσέληνον. ἐπεὶ δὲ παρὰ τὸ προπύλαιον τοῦ Διονύσου ἦν, ὁρᾶν ἀνθρώπους πολλοὺς ἀπὸ τοῦ ᾠδείου καταβαίνοντας εἰς τὴν ὀρχήστραν· δείσας δὲ αὐτούς, εἰσελθὼν ὑπὸ τὴν σκιὰν καθέζεσθαι πεταξὺ τοῦ κίονος καὶ τῆς στήλης ἐφ' ᾗ ὁ στρατηγός ἐστιν ὁ χαλκοῦς.

(3) ἐμὲ τοίνον οὐδεὶς ἂν ἀποδείξειεν σὔτ' ἀπενεχθέντα ὑπὸ τῶν φυλάρχων οὔτε παραδοθέντα τοῖς συνοίκοις οὔτε κατάστασιν παραλαβόντα. καίτοι πᾶσι ῥᾴδιον τοῦτο γνῶναι, ὅτι ἀναγκαῖον ἦν τοῖς φολάρχοις, εἰ μὴ ἀποδείξειαν τοὺς ἔχοντας τὰς καταστάσεις, αὐτοῖς ζημιοῦσθαι· ὥστε πολὺ ἂν δικαιότερον ἐκείνοις τοῖς γράμμασιν ἢ τούτοις πιστεύοιτε· ἐκ μὲν γὰρ τούτων ῥᾴδιον ἦν ἐξαλειφθῆναι τῷ βουλομένῳ, ἐν ἐκείνοις δὲ τοὺς ἱππεύσαντας ἀναγκαῖον ἦν ὑπὸ τῶν φυλάρχων ἀπενεχθῆναι.

(4) πάντες οὖν ἀγνσοῦντες τὸ ὄνομα αὐτοῦ, ἀκριβέστατα ἂν ἔφασάν με πυθέσθαι ὅπου ἐν τῇ χώρᾳ τυρὸν τῇ ἔνῃ καὶ νέᾳ· ταύτῃ αἰέ.α ἀσέαᾳ θοῦ μόνος ἑκάστου ἐκεῖσε συλλέγεσθαι τοὺς ἁραπσγ τς

(5) ἐκεῖνοι γὰρ οὐκ ἐν μὲν ταῖς παιδείαις πολλοὺς τοὺς ἐπιστατοῦντας εἶχον, ἐπειδὴ δ' εἰς ἄνδρας δοκιμασθεῖεν, ἐξῆν αὐτοῖς ποιεῖν ὅτι βουληθεῖεν. ἀλλ' ἐν αὐταῖς ταῖς ἀκμαῖς πλέονος ἐπιμελείας ἐτυγχανον ἢ παῖδες ὄντες· οὕτω γὰρ ἡμῶν οἱ πρόγονοι σφόδρα περὶ τὴν σωφροσύνην ἐσπούδαξον, ὥστε τὴν ἐξ' Ἀρείου πάγου βουλὴν ἐπέστησαν ἐπιμελεῖσθαι τῆς εὐκοσμίας, ἧς οὐχ οἷόν τ' ἦν μετασχεῖν πλὴν τοῖς καλῶς γεγονόσι καὶ πολλὴν ἀρετὴν ἐν τῷ βίῳ καὶ σωφροσύνην ἐνδεδειγμένοις, ὥστι εἰκότως αὐτὴν διενεγκεῖν τῶν ἐν τοῖς Ἕλλησι συνεδρίων.

(6) σὐκοῦν δεινὸν ἐμοὶ μὲν διαρρήδην οὕτω τῶν νόμων δεδωκότων τὴν κληρονομίαν, τούτους δ' ἔξω τῆς ἀγχιστείας πεποιηκότων, τολμᾶν τουτονὶ συκοφαντεῖν, καὶ διαγωνίσασθαι μὲν, ἡνίκ' ἐγὼ τοῦ κλήρου τὴν δίκην ἐλάγχανον, μὴ οἴεσθαι δεῖν μηδὲ παρακαταβάλλειν, οὗ περὶ τῶν τοισύτων εἴ τι δίκαιον εἶχεν εἰπεῖν διαγνωσθῆναι προσῆκεν, ἐπὶ δὲ τοῦ παιδὸς ὀνόματι πράγματ' ἐμοὶ παρέχειν καὶ περὶ τῶν μεγίστων εἰς κίνδυνον καθιστάναι.

C.—Aristotle, Ethics I., II., X.

Translate, and explain in reference to context:—

(1) οἱ δὴ κομίσαντες τὴν δόξαν ταύτην οὐκ ἐποίουν ἰδέας ἐν οἷς τὸ πρότερον καὶ ὕστερον ἔλεγον, διόπερ οὐδὲ τῶν ἀριθμῶν ἰδέαν κατεσκεύαζον· τὸ δ' ἀγαθὸν λέγεται καὶ ἐν τῷ τί ἐστι καὶ ἐν τῷ ποιῷ καὶ ἐν τῷ πρός τι, τὸ δὲ καθ' αὑτὸ καὶ ἡ οὐσία πρότερον τῇ φύσει τοῦ πρός τι (παρα-

φυάδι γὰρ τοῦτ' ἔοικε καὶ συμβεβηκότι τοῦ οὔντος)· ὥστ οὐκ ἂν εἴη κοινή τις ἐπὶ τούτοις ἰδέα.

(2) εἰ δὴ τὸ τελος ὁρᾶν δεῖ καὶ τότε μακαρίζειν ἕκαστον οὐχ ὡς ὄντα μακάριον ἀλλ' ὅτι προτέρον ἦν, πῶς οὐχ ὕτοπον, εἰ ὅτ' ἔστιν εὐδαίμων, μὴ ἀληθεύσεται κατ' αὐτοῦ τὸ ὑπάρχον διὰ τὸ μὴ βούλεσθαι τοὺς ζῶντας εὐδαιμονίζειν διὰ τὰς μεταβολάς, καὶ διὰ τὸ μόνιμόν τι τὴν εὐδαιμονίαν ὑπειληφέναι καὶ μηδαμῶς εὐμετάβολον, τὰς δὲ τύχας πολλάκις ἀνακυκλεῖσθαι περὶ τοὺς αὐτούς; δῆλον γὰρ ὡς εἰ συνακολουθοίημεν ταῖς τύχαις, τὸν αὐτὸν εὐδαίμονα καὶ πάλιν ἄθλιον ἐροῦμεν ποάλάκις, χαμαιλέοντά τινα τὸν εὐδαίμονα ἀποφαίνοντες καὶ σαθρῶς ἱδρυμένον.

(3) περὶ δὲ τιμὴν καὶ ἀτιμίαν μεσότης μὲν μεγαλοψυχία, ὑπερβολὴ δὲ χαυνότης τις λεγομένη, ἐλλειψις δὲ μικροψυχία· ὡς δ' ἐλέγομεν ἔχειν πρὸς τὴν μεγαλοπέπειαν τὴν ἐλευθεριότητα, [τῷ] περὶ μικρὰ διαφέρουσαν, οὕτως ἔχει τις καὶ πρὸς τὴν μεγαλοψυχίαν, περὶ τιμὴν οὖσαν μεγάλην, αὐτὴ περὶ μικρὰν οὖσα· ἔστι γὰρ ὡς δεῖ ὀρέγεσθαι τιμῆς καὶ μᾶλλον ἢ δεῖ καὶ ἧττον, λέγεται δ' ὁ μὲν ὑπερβάλλων ταῖς ὀρέξεσι φιλότιμος, ὁ δ' ἐλλείπων ἀφιλότιμος, ὁ δὲ μέσος ἀνώνυμος. ἀνώνυμοι δὲ καὶ αἱ διαθέσεις, πλὴν ἡ τοῦ φιλοτίμου φιλοτιμία· ὅθεν ἐπιδικάζοντια οἱ ἄκροι τῆς μέσης χώρας.

(4) τέλειόν τε τἀγαθὸν τιθέντες, τὰς δὲ κινήσεις καὶ τὰς γενέσεις ἀτελεῖς, τὴν ἡδονὴν κίνησιν καὶ γένεσιν ἀποφαίνειν πειρῶνται. οὐ καλῶς δ' ἐοίκασι λέγειν οὐδ' εἶναι κίνησιν. πάσῃ γὰρ οἰκεῖον εἶναι δοκεῖ τάχος καὶ βραδυτής, καὶ εἰ μὴ καθ' αὑτήν, οἷον τῇ τοῦ κόσμου, πρὸς ἄλλο· τῇ δ' ἡδονῇ τούτων οὐδέτερον ὑπάρχει. ἡσθῆναι μὲν γὰρ ἔστι ταχέως ὥσπερ ὀργισθῆναι, ἥδεσθαι δ' οὔ, οὐδὲ πρὸς ἕτερον, βαδίζειν δὲ καὶ αὔξεσθαι καὶ πάντα τὰ τοιαῦτα.

(5) ἔτι δὲ καὶ διαφέρουσιν αἱ καθ' ἕκαστον παιδεῖαι τῶν κοινῶν, ὥσπερ ἐπ' ἰατρικῆς· καθόλου μὲν γὰρ τῷ πυρέττοντι συμφέρει ἡσυχία καὶ ἀσιτία, τινὶ δ' ἴσως οὔ, ὅ τε πυκτικὸς ἴσως οὐ πᾶσι τὴν αὐτὴν μάχην περιτίθησιν. ἐξακριβοῦσθαι δὴ δόξειεν ἂν μᾶλλον τὸ καθ' ἕκαστον ἰδίας τῆς ἐπιμελείας γινομένης· μᾶλλον γὰρ τοῦ προσφόρου τυγχάνει ἕκαστος. ἀλλ' ἐριμελῶς θείη μὲν ἂν ἄριστα καθ' ἓν καὶ ἰατρὸς καὶ γυμναστὴς καὶ πᾶς ἄλλος ὁ καθόλου εἰδώς, τί πᾶσιν ἢ τοῖς τοιοισδί (τοῦ κοινοῦ γὰρ αἱ ἐπιστῆμαι λέγονταί τε καὶ εἰσίν.)

FOURTH YEAR.

CLASSICAL HONOURS.

PRIVATE READINGS.

ARISTOPHANES RANAE, SOPHOCLES TRACHINIAE, THEOCRITUS.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

1. Translate adding a note where necessary:—

(*a*) Παιδίον, παῖ ἠμί, παῖ.

(*b*) Ὡς κενταυρικῶς
ἐνήλαθ' ὅστις.

(*c*) Ἀλλ' οὐχ οἷός τ' εἴμ' ἀποσοβῆσαι τὸν γέλων,
ὁρῶν λεοντῆν ἐπὶ κροκωτῷ κειμένην.
τίς ὁ νοῦς; τί κόθορνος καὶ ῥόπαλον ζυνηλθέτην;

(*d*) Οὐ πρίν γ' ἄν Ἰοφῶντ' ἀπολαβὼν, αὐτὸν μόνον
ἄνευ Σοφοκλέους ὅ τι ποιεῖ κωδωνίσω.

(*e*) ΠΑ. Πλαθάνη, Πλαθάνη, δεῦρ' ἔλθ'· ὁ πανοῦργος οὑτοσί,
ὃς εἰς τὸ πανδοκεῖον εἰσελθών ποτε
ἐκκαίδεκ' ἄρτους κατέφαγ' ἡμῶν. ΠΛ. νὴ Δία,
ἐκεῖνος αὐτὸς δῆτα. ΘΑ. κακὸν ἥκει τινί.
ΠΑ. καὶ κρέα γε πρὸς τούτοισιν ἀνάβραστ' εἴκοσιν'
ἀν' ἡμιωβολιαῖα. ΘΑ. δώσει τις δίκην.
ΠΑ. καὶ τὰ σκόροδα τὰ πολλά. ΔΙ. ληρεῖς, ὦ γίναι.
κοὐκ οἶσθ' ὅ τι λέγεις. ΠΑ. οὐ μὲν οὖν με προσεδόκας,
ὁτιὴ κοθόρνους εἶχες, ἂν γνῶναί σ' ἔτι;
τί δαί; τὸ πολὺ τάριχος οὐκ εἴρηκα πω.
ΠΛ. μὰ Δί', οὐδὲ τὸν τυρόν γε τὸν χλωρόν, τάλαν,
ὃν οὗτος αὐτοῖς τοῖς ταλάροις κατήσθιεν.
ΠΑ. κἄπειτ' ἐπειδὴ τἀργύριον ἐπραττόμην
ἔβλεψεν εἰς με δριμὺ κἀμυκᾶτο γε.

(*f*) Τί δέ; μειαγωγήσουσι τὴν τραγῳδίαν;

(*g*) Νὴ τοὺς θεούς, νῦν γοῦν Ἀθη—
ναίων ἅπας τις εἰσιὼν
κέκραγε πρὸς τοὺς οἰκέτας
ζητεῖ τε ποῦ 'στιν ἡ χύτρα;
τίς τὴν κεφαλὴν ἀπεδήδοκεν
τῆς μαινίδος; τὸ τρύβλιον

τὸ περυσινὸν τέθνηκέ μοι·
ποῦ τὸ σκόροδον τὸ χθιζινόν;
τίς τῆς ἐλάας παρέτραγεν;
τέως δ' ἀβελτερώτατοι
κεχηνότες Μαμμακύθιοι
Μελιττίδαι καθῆντο.

2. Translate, commenting where necessary on the reading or construction:—

(a) Λόγος μέν ἐστ' ἀρχαῖος ἀνθρώπων φανείς,
ὡς οὐκ ἂν αἰῶν' ἐκμάθοις βροτῶν πρὶν ἂν
θάνῃ τις οὔτ' εἰ χρηστὸς οὔτ' εἴ τῳ κακός;

(b) Λέχος γὰρ Ἡρακλεῖ κριτὸν
ξυστᾶς' ἀεί τιν' ἐκ φόβου φόβον τινέφω
κείνου προκηραίνουσα.

(c) Πολλὰ γὰρ ὥστ' ἀκάμαντος ἢ νότου ἢ βορέα τις
κύματ' ἐν εὐρεῖ πόντῳ βάντ' ἐπιόντα τ' ἴδῃ,
οὕτω δὲ τὸν καδμογενῆ τρέφει τὸ δ' αὔξει βιότου
πολύπονον ὥσπερ πέλαγος Κρήσιον.

(d) Οὐ τἄρα τῷ γε πρόσθεν οὐδὲν ἐξ ἴσου
χρόνῳ διοίσει γλῶσσαν.

(e) Τῆς ἐκεῖνος οὐδαμὰ
βλαστας ἐφώνει δῆθεν οὐδὲν ἱστορῶν.

(f) Ἦν δ' ἀμφίπλεκτοι κλίμακες.

(g) Ἡνίκ' ἦν μέσῳ πόρῳ.

(h) Ἔχριον ἀργῆτ' οἰὸς εὐέρου πόκῳ.

(i) Ἕως ἂν ἀρτίχριστον ἁρμόσαιμί που.

(k) Πλευραῖσι γὰρ προσμαχθὲν ἐκ μὲν ἐσχάτας
βέβρωκε σάρκας πνευμόνων τ' ἀρτηρίας
ῥοφεῖ ξυνοικοῦν· ἐκ δὲ χλωρὸν αἷμά μου
πέπωκεν ἤδη καὶ διέφθαρμαι δέμας
τὸ πᾶν ἀφράστῳ τῇδε χειρωθεὶς πέδῃ.

(l) Ὡς ἐργασείων οὐδὲν ὢν λέγω θοροῖς.

3. Translate:—

(a) Πὰρ δὲ οἱ ἄνδρες
καλὸν ἐθειράζοντες ἀμοιβαδὶς ἄλλοθεν ἄλλος
νεικείουσ' ἐπέεσσι. τὰ δ' οὐ φρενὸς ἅπτεται αὐτᾶς·
ἀλλ' ὅκα μὲν τῆνον ποτιδέρκεται ἄνδρα γελᾶσα,
ἄλλοκα δ' αὖ ποτὶ τὸν ῥιπτεῖ νόον. οἱ δ' ὑπ' ἔρωτος
δηθὰ κυλοιδιόωντες ἐτώσια μοχθίζοντι.

(b) Νῦν δ' ἴα μὲν φορέοιτε βάτοι φορέοιτε δ' ἄκανθαι
ἥ δὲ καλὰ ναρκισσος ἐπ' ἀρκεύθοισι κομάσαι·

πάντα δ' ἔναλλα γένοιντο καὶ ἁ πίτυς ὄχνας ἐνείκαι,
Δάφνις ἐπεὶ θνάσκει καὶ τὰς κύνας ὤλαφος ἕλκοι
κἠξ ὀρθῶν τοὶ σκῶπες ἀηδόσι γαρύσαιντο.

(c) Νῦν δὴ μούνα ἐοῖσα πόθεν τὸν ἔρωτα δακρύσω·
ἐκ τήνω δ' ἀρξῶ, τίς μοι κακὸν ἄγαγε τοῦτο
ἦνθ' ἁ τῶ Εὐβούλοιο καναφόρος ἅμιν Ἀναξώ
ἄλσος ἐς Ἀρτέμιδος τᾷ δὴ τόκα πολλὰ μὲν ἄλλα
θήρια πομπεύεσκε περισταδὸν ἐν δὲ λέαινα.

(d) Ὦ λευκὰ Γαλάτεια τί τὸν φιλέοντ' ἀποβάλλῃ
μόσχῳ γαυροτέρα, σφηλωτέρα ὄμφακος ὠμᾶς,
φοιτῇς δ' αὖθ' οὕτως, ὅκκα γλυκὺς ὕπνος ἔχῃ με,
οἴχῃ δ' εὐθὺς ἰοῖσ', ὅκκα γλυκὺς ὕπιος ἀνῇ με,
φεύγεις δ' ὥσπερ ὄϊς πολιὸν λύκον ἀθρήσασα;
ἠράσθην μὲν ἔγωγα τεοῦς κόρα, ἀνίκα πρᾶτον
ἦνθες ἐμᾷ σὺν ματρὶ θέλοισ' ὑακίνθινα φύλλα
ἐξ ὄρεος δρέψασθαι, ἐγὼ δ' ὁδὸν ἀγεμόνευον.

FIRST YEAR.

LATIN BOOKS.

FRIDAY, APRIL 3RD, 1903:— MORNING, 9 TO 12.

N.B.—*A, B and C to be done in separate books.*

A.—OVID.

1. Translate, adding an explanatory note where necessary:—

(*a*) Impositamque sibi qui non bene pertulit Hellen
tempora nocturnis aequa diurna facit.

Scan these two lines.

(*b*) Editus hic ego sum; nec non ut tempora noris
cum cecidit fato consul uterque pari.

Where was Ovid born, and in what year? Who were the two consuls?

hoc tamen asperitas indice nota loci est.

(*d*) 'Quid vult palma sibi rugosaque carica, dixi,
et data sub niveo candida mella cado?'

(*e*) Neve graves cultis Cerealia dona cavete
agmine laesuro depopulentur aves.
vos quoque formicae subiectis parcite granis;
post messem praedae copia maior erit.

(*f*) Nunc quoque per pueros iaculis incessitur index
et pretium auctori volneris ipsa datur.

(*g*) Ossa tegit tumulus tumulus pro corpore magnus
quo lapis exiguus par sibi carmen habet.

(*h*) Quicquid aget cum te scierit venisse relinquet
nec mora quid venias quidve requiret agam;
vivere me dices sed sic ut vivere nolim
nec mala tam longa nostra levata mora.

(*i*) Ter quater evolvi signantes tempora fastos
nec Sementiva est ulla reperta dies.

What work of Ovid is this taken from?

2. In the following lines do not translate but parse the words in italics:—

(*a*) Tum deus incumbeus baculo quem *dextra* gerebat.

(*b*) Tum patitur *cultus* ager et renovatur aratro.

B.—Cicero.

1. Translate with notes on the words printed in italics:—

(*a*) Ad me autem *litteras* quas misisti quamquam exiguam significationem tuae erga me voluntatis habebant, tamen mihi scito iucundas fuisse. Nulla enim re tam laetari soleo quam meorum officiorum conscientia, quibus si quando non mutue respondetur, apud me plus offici residere facillime patior.

(*b*) Et simul, si uno argumento unaque in persona

mens tua tota versabitur, cerno iam animo quanto omnia uberiora atque ornatiora futura sint. Neque tamen ignoro quam impudenter faciam, qui primum tibi tantum oneris imponam, deinde etiam ut ornes me *postulem*. Sed tamen qui semel verecundiae finis transierit, eum bene et naviter oportet esse impudentem.

Explain carefully why *postulem* is Subjunctive.

(*c*) *Martis* vero signum quo mihi, pacis auctori? Gaudeo nullum *Saturni* signum fuisse, haec enim duo signa putarem mihi aes alienum attulisse. *Ista* quidem *summa ne* ego multo libentius emerim deversorium Tarracinae, ne semper hospiti molestus sim.

(*d*) Hoc *tibi* tam ignoscemus nos amici quam ignoverunt *Medeae*, "quae Corinthum arcem altam habebant, matronae opulentae, optimates," quibus illa manibus *gypsatissimis* persuasit ne sibi vitio illae verterent quod abesset a patria.

Where is the above line quoted from?

(*e*) Tu autem *hoc* tibi persuade, si commodo valetudinis tuae fieri possit, nihil me *malle* quam te esse mecum; si autem intelleges opus esse te *Patris* convalescendi causa paulum commorari, nihil me malle quam te valere.

2. State to whom the pieces (*a*), (*b*), (*d*) and (*e*) in the above question were addressed. State the year of the birth, consulship and death of Cicero. Of what province was he governor?

3. Do not translate the following passage, but parse the words in Italics and explain clearly their construction:—Itaque te plane etiam atque etiam rogo ut et ornes ea vehementius etiam quam fortasse sentis et in eo leges historiae neglegas gratiamque illam de qua suavissime quodam in prooemio scripsisti a qua te

flecti non magis potuisse demonstras quam Herculem Xenophontium illum a Voluptate, eam, si me tibi vehementius commendabit *ne aspernere*.

Parse Xenophontium and translate it into English.

C.—Sallust of Catiline.

1. Translate, with brief notes on italicised words:

(*a*) Nam et priusquam *incipias consulto*, et ubi consulueris mature facto opus est.

(*b*) Tum Catilina polliceri *tabulas novas*, *proscriptionem* locupletium, magistratus, sacerdotia, rapinas, alia omnia quae bellum atque lubido victorum fert.

(*c*) Compertum ego habeo, milites, verba virtutem non addere, neque ex ignavo strenuum neque fortem ex timido exercitum oratione imperatoris fieri. Quanta cuiusque animo audacia natura aut moribus inest, tanta in bello patere solet: quem neque gloria neque pericula excitant, nequiquam hortere: timor animi auribus obficit.

(*d*) Sed ea malo dicere, quae maiores nostri contra lubidinem animi sui recte atque ordine fecere. *Bello Macedonico*, quod cum rege Perse gessimus, *Rhodiorum civitas* magna atque magnifica, quae populi Romani opibus creverat, infida atque advorsa nobis fuit. Sed postquam bello confecto de Rhodiis consultum est, maiores nostri, ne quis divitiarum magis quam iniuriae causa bellum inceptum diceret, *inpunitos eos dimisere*.

2. (*a*) To what speakers does Sallust attribute the words in the last two extracts?

(*b*) Write brief notes on: pecuniae repetundae, quaestor pro praetore, senati decretum, ex libris Sibyllinis, pedibus in sententiam Ti. Neronis iturum se dixerat.

FIRST YEAR.

LATIN PROSE AND TRANSLATION AT SIGHT.

FRIDAY, APRIL 3RD, 1903:— AFTERNOON, 2 TO 4.30.

N.B.—A and B to be sent up in different books.

A.—LATIN COMPOSITION.

Translate:—

(*a*) The Romans could not be persuaded to ask Caesar to attack the camp.

(*b*) Having remained at Miletus for three years, he returned to Athens; his brother lives at Puteoli.

(*c*) He often asks me why I did not go with you to the city.

(*d*) Will you assist me or not?

(*e*) Do not spare the citizens.

(*f*) He had departed from the camp in order to set out for Rome on the following day.

(*g*) He returned to the city for the purpose of praising the citizens.

(*h*) Having arrived at Syracuse he promised that reinforcements should be sent.

(*i*) He said that his son had been injured (noceo).

(*k*) He repents of his crime.

(*l*) Seizing a sword he defended his master.

(*m*) After saying (loquor) this he became silent (conticesco).

(*n*) Caesar ought to command (impero) the soldiers to advance as quickly as possible.

(*o*) This will be a proof (documentum) of your valour.

B.—Translation at Sight.

1. Multa exstant facete ab eo dicta. Cum Lentulum, generum suum, exiguae staturae hominem, vidisset longo gladio accinctum, "Quis," inquit, "generum meum ad gladium adligavit?"

Matrona quaedam, iuniorem se quam erat simulans, dictitabat se triginta tantum annos habere; cui Cicero, "Verum est," inquit, "nam hoc viginti annos audio."

Caesar, altero consule mortuo die Decembris ultima, Caninium consulem hora septima in reliquam diei partem renuntiaverat; quem cum plerique irent salutatum de more, "Festinemus," inquit Cicero, "priusquam abeat magistratu." De eodem Caninio, scripsit Cicero: "Fuit mirifica vigilantia Caninius, qui toto suo consulatu somnum non viderit."

2. Lenis adhuc somnus placidis Erysichthona pennis
mulcebat: petit ille dapes sub imagine somni,
oraque vana movet dentemque in dente fatigat
exercetque cibo delusum guttur inani,
proque epulis teneras nequicquam devorat auras
ut vero est expulsa quies, furit ardor edendi,
perque avidas fauces immensaque viscera regnat.
nec mora: quod pontus, quod terra, quod educat aer,
poscit; et appositis queritur ieiunia mensis,
inque epulis epulas quaerit; quodque urbibus esse,
quodque satis populo poterat, non sufficit uni.

FIRST YEAR.

ROMAN HISTORY.

Friday, April 3rd, 1903:—Afternoon, 4.30 to 5.15.

N.B.—*Brevity should be studied.*

1. Explain the following terms:—dictator, praetor, tribunus plebis, concilium plebis, comitia centuriata, populus, plebs.

2. Where are the following and with what events are they connected:—Mylae, Panormus, Metaurus, Saguntum, Cannae, Trasumene, Luceria, Demetrias, Pydna? Add dates where you can.

3. Write two or three lines on each of the following:—Antiochus Magnus, M. Fulvius Nobilior, Elder Cato, Philopoemen, Popilius Laenas, Flamininus, Aemilius Paulus, Mummius.

SECOND YEAR.

LATIN.

FRIDAY, APRIL 3RD, 1903:— MORNING, 9 TO 12.

I. LIVY, Bk. II.

A, B, C and D to be written in separate books.

A.

1. Translate with notes on the words printed in italics:

(*a*) Cum hostes adessent, pro se quisque in urbem ex agris *demigrant*, urbem ipsam saepiunt praesidiis. Alia muris, alia Tiberi obiecto videbantur tuta. Pons sublicius iter paene hostibus *dedit*, ni unus vir fuisset Horatius Cocles: *id* munimentum illo die fortuna urbis Romanae habuit.

(*b*) Tum vero plebs incerta qualis habitura consules esset, coetus nocturnos, pars *Esquiliis* pars in Aventino, fecere, ne in foro subitis trepidaret consiliis et omnia temere ac fortuito ageret. Eam rem consulis rati, ut erat, perniciosam, ad patres deferunt, sed *delatam consulere* ordine non licuit.

B.

3. Translate:

Certatum eo quoque anno cum tribunis est. Vana lex vanique legis auctores iactando inritum munus facti. Fabium inde nomen ingens post tres continuos consultatus unoque velut tenore omnes expertos tribuniciis certaminibus habitum. Itaque ut bene locatus mansit in ea familia aliquamdiu honos. Bellum inde

Veiens initum: et Volsci rebellarunt. Sed ad bella externa prope supererant vires abutebanturque iis inter semet ipsos certando.

4. Translate, with explanatory notes:

(*a*) Optabitis, *me dius fidius,* propediem ut mei similes Romana plebs patronos habeat.

(*b*) In exeuntem e curia impetus factus esset, ni peropportune tribuni *diem dixissent.*

(*c*) Signa referunt, maestique—*crederes* victos—exsecrantes *navatam* ab equite *operam* redeunt in castra.

(*d*) Matura res erat, *tergiversantur* tamen.

5. Translate:

Varia fortuna belli atroci discordia domi forisque annum exactum insignem maxime comitia tributa efficiunt, res maior victoria suscepti certaminis quam usu: plus enim dignitatis comitiis ipsis detractum est patribus ex concilio submovendis, quam virium aut plebi additum est aut demptum patribus.

II. Horace, Selected Odes.

C.

1. Translate:

(*a*) Crescit occulto velut arbor aevo
Fama *Marcelli;* micat inter omnes
Iulium sidus velut inter ignes
Luna minores.

(*b*) Destrictus ensis cui super impia
Cervice pendet, non *Siculae dapes*
Dulcem elaborabunt saporem,
Non avium citharaeque cantus
Somnum reducent. Somnius agrestium
Lenis virorum non humiles domos
Fastidit umbrosamque ripam
Non Zephyris agitata *tempe.*

(*c*) Ut mater iuvenem, quem Notus invido
Flatu *Carpathii* trans maris aequora
Cunctantem spatio longius annuo
Dulci distinet a domo,
Votis ominibusque et precibus vocat,
Curvo nec faciem litore dimovet;
Sic desideriis icta fidelibus
Quaerit patria Caesarem.

(*d*) Nos manet Oceanus circumvagus; arva beata
Petamus, arva divites et *insulas*,
Reddit ubi Cererem tellus inarata quotannis
Et imputata floret usque vinea,
Mella cava manant ex ilice, montibus altis
levis crepante lympha desilit pede.

2. (*a*) Write brief notes on italicized words.

(*b*) Give the scheme of the metre in which each of the various extracts is written.

(*c*) Remark on the common characteristics which unite the six odes with which the third book opens, and show by internal evidence the time of their composition.

III. Virgil, *Aeneid, VII., VIII.*

D.

1. Translate:—

(*a*) Mittitur et magni Venulus Diomedis ad urbem,
qui petat auxilium et Latio consistere Teucros
advectum Aenean classi victosque Penates
inferre et fatis regem se dicere posci
edoceat, multasque viro se adiungere gentes
Dardanio et late Latio increbrescere nomen;
quid struat his coeptis, quem si Fortuna sequatur
eventum pugnae cupiat, manifestius ipsi
quam Turno regi aut regi adparere Latino.

Explain the construction of *struat* and *apparere; i.e.*, what verbs do the sentences in which they respectively stand depend upon?

(*b*) Quanta per Idaeos saevis effusa Mycenis
tempestas ierit campos quibus actus uterque
Europae atque Asiae fatis concurrerit orbis
audiit et si quem tellus extrema refuso
submovet Oceano, et si quem extenta plagarum
quattuor in medio dirimit plaga solis iniqui.

2. Translate, adding where necessary a brief note on the grammar or allusion:—

(*a*) Proxima Circaeae raduntur litora terrae.

(*b*) Fata per Aeneae iuro dextramque potentem
sive fide seu quis bello est expertus et armis.

State carefully what this latter sentence depends upon.

(*c*) Idem Atlas generat caeli qui sidera tollit.

(*d*) Non secus ac si qua penitus vi terra dehiscens infernas reseret sedes et regna recludat pallida.

(*e*) Te filia Nerei te potuit lacrimis Tithonia flectere coniunx.

What are the two allusions here?

(*f*) Ille inter caedem Rutulorum elapsus in agros confugere et Turni defendier hospitis armis.

A note on the form defendier.

(*g*) Hoc tunc ignipotens caelo descendit ab alto.

A note on any peculiar grammatical form.

(*h*) Tanta mole viri turritis puppibus instant.

3. Quote any lines you can remember—not more than 5—of any one of the following: (*a*) The story of Hippolytus, (*b*) the story of Hercules and Cacus, (*c*) the description of the arms of Vulcan.

SECOND YEAR.

LATIN PROSE COMPOSITION, AND TRANSLATION AT SIGHT.

FRIDAY, APRIL 3RD, 1903:—AFTERNOON, 2 TO 4.30.

Write I. and II. in separate books.

I. LATIN PROSE COMPOSITION.

Then King Tarquinius sent to Rome, to ask for all the goods that had belonged to him; and the senate after a while decreed that the goods should be given back. But those whom he had sent to Rome to ask for his goods, had meetings with many young men of noble birth, and a plot was laid to bring back the king. Now a slave happened to overhear them talking together, and when he knew that the letters were to be given to the messengers of Tarquinius, he told all that he had heard to the consuls. Then they came and seized the young men and their letters, and so the plot was broken up. ARNOLD.

II. TRANSLATION AT SIGHT.

(*a*) Illum equitem aiebant sex dierum spatio transcurrisse longitudinem Italiae, et eo die cum Hasdrubale in Gallia signis collatis pugnasse, quo eum castra adversus sese in Apulia posita habere Hannibal credidisset. Nomen Neronis satis fuisse ad continendum in castris Hannibalem; Hasdrubalem vero qua alia re quam adventu eius obrutum atque exstinctum esse? itaque iret alter consul sublimis curru multiiugis, si vellet, equis; uno equo per urbem verum triumphum vehi Neronemque, etiam si pedes incedat, vel parta eo bello vel spreta eo triumpho gloria memorabilem fore.

(*b*) Aesopo quidam scripta recitarat mala,
in quis inepte multum se iactaverat.
scire ergo cupiens quidnam sentiret senex,
"numquid tibi" inquit "visus sum superbior?
haud vana nobis ingeni fiducia est?"
confectus ille pessimo volumine
"ego" inquit "quod te laudas vehementer probo,
namque hoc ab alio numquam continget tibi."

SECOND YEAR.

ROMAN HISTORY AND QUINTILIAN.

FRIDAY, APRIL 3RD, 1903:—AFTERNOON, 4.30 TO 5.30.

I. ROMAN HISTORY. (B. C. 133-31).

Write upon any *three* of the following subjects:

1. The causes of the civil troubles at the beginning of this period.

2. The war with the Cimbri and Teutones (B. C. 113-101).

3. Chief events from B. C. 79 to B. C. 72.

4. The banishment of Cicero.

II. QUINTILIAN X., §§ 37-131.

(*Not more than three questions to be attempted.*)

1. Briefly describe the character of Pindar's poetry. Add a short note tracing the connection between the lyric poetry of Greece and Roman lyric poetry.

2. What type of literary composition is represented by Theocritus? Can you say anything of its later history?

3. Write a short note on each of the following:—Tyrtaeus, Menander, Isocrates, Lucan, Seneca, Asinius Pollio.

4. How does Quintilian classify Roman poetry? Mention names in connection with each branch of his classification?

5. What does Quintilian say of Roman satire, and how do you explain his statement?

THIRD YEAR.

LATIN.

PLINY AND LUCRETIUS.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

(Write A and B in separate books.)

A.

1. Translate:—

(*a*) Quo modo te veteres Marsi tui? quo modo emptio nova? Placent agri, postquam tui facti sunt? Rarum id quidem: nihil enim aeque gratum est adeptis quam concupiscentibus. Me praedia materna parum commode tractant, delectant tamen ut materna, et alioqui longa patientia occalui. Habent hunc finem adsiduae querellae quod queri pudet. Vale.

2. Translate with explanatory notes:

(*a*) Ecce *tibi* Regulus 'quaero' inquit, *Secunde*, quid de Modesto sentias.'

(*b*) O mare, o litus, verum secretumque μουῖοσνε, quam multa invenitis, quam multa dictatis!

(*c*) Mirum est quam singulis diebus in urbe ratio aut constet aut constare videatur, pluribus iunctisque non constet. Nam si quem interroges 'hodie quid egisti?' respondeat 'officio togae virilis interfui, sponsalia aut nuptias frequentavi, ille me ad signandum testamentum, ille in advocationem, ille in consilium rogavit.'

(*d*) Circumtulit oculos et 'cur' inquit 'me putas hos tantos dolores tam diu sustinere? ut scilicet *isti latroni* vel uno die supersum.' *Dedisses* huic animo par corpus, fecisset quod optabat. Adfuit tamen deus voto, *cuius* ille compos, ut iam securus liberque moriturus, multa illa vitae sed minora retinacula abrupit.

3. Write brief notes on: (*a*) relegatio; (*b*) the court of the centumviri; (*c*) flamen Augustalis; (*d*) xystus; (*e*) tutor relictus; (*f*) Pliny's style.

4. Give the substance of Pliny's remarks on the death Virginius Rufus (Ep. II., 1.).

B.

(*Candidates are requested to answer questions 3 and 4 before attempting 1 and 2 and 2 before attempting 1.*)

1. Translate:—

Assem para et accipe auream fabulam, fabulas immo: nam me priorum nova admonuit nec refert a qua potissimum incipiam. Verania Pisonis graviter iacebat huius dico Pisonis quem Galba adoptavit. Ad hanc Regulus venit. Primum impudentiam hominis qui venerit ad aegram cuius marito inmicissimus ipsi invisissimus fuerat. Esto si venit tantum; at ille etiam proximus toro sedit, quo die qua hora nata esset interrogavit. Ubi audiit, componit vultum, intendit oculos, movet labra, agitat digitos, computat; nihil; ut diu miseram expectatione suspendit, 'habes' inquit 'climactericum tempus sed evades.'

2. Translate:—

Cuius ego ingressus vestigia dum rationes
persequor ac doceo dictis quo quaeque creata
foedere sint in eo quam sit durare necessum
nec validas valeant aevi rescindere leges,
quo genere in primis animi natura reperta est
nativo primum consistere corpore creta
nec posse incolumis magnum durare per aevum
sed simulacra solere in somnis fallere mentem,
cernere cum videamur eum quem vita relinquit,
quod superest, nunc huc rationis detulit ordo,
ut mihi mortali consistere corpore mundum
nativumque simul ratio reddunda sit esse;

et quibus ille modis congressus materiai
fundarit terram caelum mare sidera solem
lunaique globum; tum quae tellure animantes
extiterint et quae nullo sint tempore natae.

3. Translate, adding a word of comment where necessary:—

(*a*) Inde boves Lucas turrito corpore taetras
anguimanus belli docuerunt volnera Poeni
sufferre.

(*b*) Nam fovea atque igni prius est venarier ortum
quam saepire plagis saltum canibusque ciere.

(*c*) Ne quid ab admissum foede dictumve superbe
poenarum grave sit solvendi tempus adultum.

(*d*) Protraxe.

(*e*) Proinde sine incassum defessi sanguine sudent.

(*f*) Corde vigebant.

(*g*) Viva videns vivo sepeliri viscera busto.

(*h*) Saetigerisque pares subus silvestria membra.
What other reading is there?

(*i*) Ut propagando possint procudere saecla.

(*k*) Quidquid id est nilo fertur maiore figura
quam nostris oculis qua cernimus esse videtur.

(*l*) Quo volvenda micant aeterni sidera mundi.

(*m*) Omne genus de principiis.

(*n*) Omnimodis.

(*o*) Inde suum per iter recreavit cuncta gubernans.

(*p*) Sicut summarum summa est. What is the 'Summarum summa?'

(*q*) Denique iam tuere hoc.

(*r*) Quare proporro sibi cumque senescere credas.
What other readings are found?

(*s*) Nam primum quicquid fulgoris disperit ei
quocunque accidit.

(*t*) Privas mutatur in horas.

(*u*) Denique non armis opus est non moenibus altis
qui sua tutentur.

(*x*) Notities divis hominum unde est insita primum
quid vellent facere ut scirent animoque viderent?

(*y*) Propter Atlanteum litus pelageque sonora.

3. *Either* draw a map showing the division of Asia Minor into provinces in the 1st century A. D. *or* say a few words on the MSS. and editors of Lucretius.

THIRD AND FOURTH YEARS.

LATIN.

TACITUS, HISTORIES, BK. I.

FRIDAY, APRIL 17TH, 1903:—MORNING, 10.30 TO 12.

1. Translate:

(*a*) Nec diutius Galba cunctatus speciosiora suadentibus accessit. Praemissus tamen in castra Piso ut iuvenis magno nomine recenti favore et infensus Tito Vinio, seu quia erat, seu quia irati ita volebant; et facilius de odio creditur.

(*b*) Curam navium Moschus libertus retinebat ad adservandam honestiorum fidem immutatus. Peditum equitumque copiis Marius Celsus, Annius Gallus rectores destinati. Sed plurima fides Licinio Proculo praetorii praefecto. Is urbanae militiae impiger, bellorum insolens, auctoritatem Paulini, vigorem Celsi, maturitatem Galli, ut cuique erat, criminando, quod facillimum factu est, pravus et callidus bonos et modestos anteibat.

2. Translate, with explanatory notes:

(*a*) Si inmensum imperi corpus stare ac librari sine rectore posset, dignus eram a quo res publica inciperet: nunc eo necessitatis iam pridem ventum est, ut nec mea senectus conferre plus populo Romano posset quam bonum successorem nec tua plus iuventa quam bonum principem. Sub Tiberio et Gaio et Claudio unius familiae quasi hereditas fuimus: loco libertatis erit quod eligi coepimus, et finita Iuliorum Claudiorumque domo optimum quemque adoptio inveniet.

(*b*) Repetundarum criminibus sub Claudio ac Nerone ceciderant: placuit ignoscentibus verso nomine, quod avaritia fuerat, videri maiestatem, cuius tum odio etiam bonae leges peribant.

3. Translate, with brief notes on italicised words:

Opus adgredior opimum casibus, atrox praeliis, discors seditionibus, ipsa etiam *pace saevom. Quattuor principes* ferro interempti: *trina bella civilia, plura externa ac permixta.* Iam vero Italia novis cladibus vel post longam saeculorum seriem repetitis afflicta: *haustae aut obrutae urbes*, fecundissima Campaniae *ora.*

4. Define the following words or phrases: procurator; praefectus legionis; principia castrorum; potentia, potestas, principatus; basilicae; precarium seni imperium; delatores.

5. What were the sources of information on which Tacitus must have drawn in the composition of his *Histories?*

THIRD AND FOURTH YEARS.

LATIN COMPOSITION AND UNSEEN.

WEDNESDAY, APRIL 15TH, 1903:—AFTERNOON, 2 TO 5.

(*A and B to be sent up in separate books.*)

A.—LATIN PROSE.

As soon as news was brought that the troops were coming the Emperor went out of the city to meet them, and having mounted a throne which had been placed outside the gates, delivered a short speech to the soldiers. He said that they knew what his own feelings were towards those who had fought in his cause and whose labours he himself had shared; and that while he lived, the honour which they had deserved would be theirs; but he asked them to remember that his life was uncertain and to obey another ruler whoever he might be, as faithfully as they had obeyed him for their own and their country's sake. Let them be faithful to their country; let them put *her* welfare above the interests of any party or leader whatever, so as not to bring upon their fellow-citizens the miseries of civil war.

B.—TRANSLATION AT SIGHT.

STORM OF CREMONA.

Incipere obpugnationem fesso per diem noctemque exercitu arduum et nullo iuxta subsidio anceps: sin Bedriacum redirent, intolerandus tam longi itineris labor et victoria ad inritum revolvebatur: munire castra, id quoque propinquis hostibus formidolosum, ne dispersos et opus molientes subita eruptione turbarent. quae super cuncta terrebat ipsorum miles periculi quam

morae patientior: quippe ingrata quae tuta, ex temeritate spes; omnisque caedes et vulnera et sanguis aviditate praedae pensabantur.

Huc inclinavit Antonius cingique vallum corona iussit. primo sagittis saxisque eminus certabant, maiore Flavianorum pernicie, in quos tela desuper librabantur; mox vallum portasque legionibus attribuit, ut discretus labor fortes ignavosque distingueret atque ipsa contentione decoris accenderentur. proxima Bedriacensi viae tertiani septimanique sumpsere, dexteriora valli octava ac septima Claudiana; tertiadecumanos ad Brixianam portam impetus tulit. paulum inde morae, dum ex proximis agris ligones, dolabras, et alii falces scalasque convectant: tum elatis super capita scutis densa testudine succedunt. Romanae utrimque artes: pondera saxorum Vitelliani provolvunt, disiectam fluitantemque testudinem lanceis contisque scrutantur, donec soluta compage scutorum exsangues aut laceros prosternerent multa cum strage.

THIRD AND FOURTH YEARS.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 10.30.

ROMAN HISTORY—THE LAST CENTURY OF THE REPUBLIC.

1. How far did the legislation of Gaius Gracchus resemble, and in what respects did it differ from, that of his brother Tiberius?

2. Sketch the subsequent history of the Tribunate at Rome.

3. Describe the Sullan constitution. To what causes do you attribute its overthrow?

4. Give a brief account of the state of parties at Rome at the time of Cicero's entrance on political life.

5. What led to the civil war between Caesar and Pompeius?

6. Trace the steps by which Octavianus rose to supreme power. How far is it true to say that his rule was a masked despotism?

FIRST YEAR.

LATIN (HONOURS).

SPECIAL PAPER.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

A.—GRAMMAR.

1. Translate:—

(*a*) It was folly to hope, effrontery to urge.
(*b*) A few pence.
(*c*) Where in the world are we?
(*d*) Prayer to the gods.
(*e*) And I shall never forget that night.
(*f*) With no auspices or favourable sacrifice.
(*g*) I care not a straw.
(*h*) More than seven hundred were taken.
(*i*) To form an alliance.
(*k*) Where can I get a stone?
(*l*) Whose surname was Africanus.
(*m*) He thought nobody a man in comparison with himself.
(*n*) Good heavens!
(*o*) Looking cruelly.
(*p*) Nor did the wiles of Juno escape the notice of her brother.

2. Translate the following and comment on the use of the cases:—

(*a*) Animi pendeo.
(*b*) Neque cernitur ulli.
(*c*) Proxime deos accessit Clodius.
(*d*) Quid tibi hanc tactio est?
(*e*) Virile secus.
(*f*) Ollam denariorum implere.
(*g*) Postridie.
(*h*) Ut a Mutina discederet.
(*i*) Tota Sicilia (Abl.).
(*k*) Excessus e vita.

B.—TRANSLATION.

1. Translate idiomatically:—

(*a*) But Rome never produced a succession of notable historians; because the more ability a Roman dis-

played the more busily he was engaged in active enterprises.

(*b*) The most convincing proof of this I consider to be the fact that in time of war it was more frequently found necessary to punish those who had attacked the enemy without orders than those who had committed the crime of abandoning their post or retreating before an onslaught of the enemy.

(*c*) For avarice proved fatal to loyalty, honesty and all other virtues; in their place it introduced pride, cruelty, irreligion and unbounded venality.

(*d*) To my much belauded consulship I owe the loss of brother and children, country and happiness, and I can only hope that you in your turn have suffered nothing worse than the loss of me.

(*e*) I want you to write me a long letter containing all the political news, for I shall always regard you as my most reliable source of information.

(*f*) For these reasons, although it was a great trial to me not to have seen you, nevertheless it would have caused us greater pain to have met and still more to have separated.

C.—Virgil, Bucolics.

1. Translate:—

(*a*) Tum Phaethontiadas musco circumdat amarae
corticis atque solo proceras erigit alnos.
tum canit errantem Permessi ad flumina Gallum
Aonas in montes ut duxerit una sonorum
utque viro Phoebi chorus adsurrexerit omnis;
ut Linus haec illi divino carmine pastor
floribus atque apio crines ornatus amaro
dixerit: hos tibi dant calamos, en accipe, Musae,
Ascraeo quos ante seni, quibus ille solebat
cantando rigidas deducere montibus ornos.

(*b*) Teque adeo decus hoc aevi, te Consule, inibit,
Pollio et incipient magni procedere menses;
te duce si qua manent sceleris vestigia nostri
inrita perpetua solvent formidine terras.
ille deum vitam accipiet divisque videbit
permixtos heroas et ipse videbitur illis
pacatumque reget patriis virtutibus orbem.
at tibi prima, puer, nullo munuscula cultu

errantes hederas passim cum baccare tellus
mixtaque ridenti colocasia fundet acantho.

2. What do you know of the Phaethontiades, Senex Ascraeus, Pollio?

3. Quote not more than 10 consecutive lines from the Bucolics of Virgil.

THIRD YEAR.

CLASSICAL HONOURS.

LATIN.

PRIVATE READINGS.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

A.—VIRGIL AND SALLUST.

1. Translate, with explanatory notes:

(*a*) Virgil, Aeneid, Bk. VI., vs. 724-735.

(*b*) Sallust, Catiline, ch. 20, §§ 11, 12; ch. 51, 4, 5.

2. Write down a few lines, commencing with *excudent alii*, in which Virgil compares the Roman destiny with the Greek.

3. Mention at least three passages in the sixth book of the Aeneid which have been suggested by the eleventh book of the Odyssey.

4. Write notes, grammatical and general, on the following passages:

(*a*) torva tuentem lenibat animum.

(*b*) Viden' ut geminae stant vertice cristae,
Et pater ipse suo superum iam signat honore?

(*c*) Aspice ut insignis spoliis Marcellus opimis
Ingreditur!

(*d*) Quaesitor Minos urnam movet.

(*e*) quisque suos patimur manes.

(*f*) Ea potestas per senatum more Romano magistratui maxuma permittitur, exercitum parare, bellum gerere, coercere omnibus modis sociis atque civis, domi militiaeque imperium atque iudicium summum habere; aliter sine populi iussi nullius earum rerum consuli ius est. (Also translate).

5. What is Quintilian's estimate of Sallust as an historian?

Describe the main characteristics of Sallust's style.

B.—Horace and Cicero.

Translate, adding a brief note where required:—

1. (*a*) Non possis oculo quantum contendere Lynceus:
non tamen idcirco contemnas lippus inungi;
nec quia desperes invicti membra Glyconis,
nodosa corpus nolis prohibere cheragra.

(*b*) Nam cur
quae laedunt oculum festinas demere: si quid
est animum differs curandi tempus in annum?

(*c*) Non tu corpus eras sine pectore.

To whom is this addressed?

(*d*) Tu quotus esse velis rescribe et rebus omissis
atria servantem postico falle clientem.

(*e*) Caerite cera
digni.

(*f*) Quinque dies tibi pollicitus me rure futurum
sextilem totum mendax desideror. atqui
si me vivere vis recteque videre valentem
quam mihi das aegro dabis aegrotare timenti
Maecenas veniam, dum ficus prima calorque
designatorem decorat lictoribus atris
dum pueris omnis pater et matercula pallet
officiosaque sedulitas et opella forensis
adducit febres et testamenta resignat.

(*g*) Smyrna quid et Colophon? maiora minorane fama?

(*h*) Pernicies et tempestas barathrumque macelli.

(*i*) Qui melior servo qui liberior sit avarus
in triviis fixum cum se demittit ob assem
non video.

(*k*) Aut tineas pasces taciturnus inertes
aut fugies Uticam aut vinctus mitteris Ilerdam.

2. (*e*) Ut fueris dignior quam Plancius—de quo ipso tecum ita contendam paulo post ut conservem dignitatem tuam—sed ut fueris dignior, non competitor a quo es victus sed populus a quo es praeteritus in culpa est.

(*b*) Quare noli me ad contentionem vestrum vocare Laterensis.

(*c*) Deinde tui municipes sunt illi quidem splendidissimi homines sed tamen pauci, si quidem cum Atinatibus conferantur.

(*d*) Vitia me hercule Cn. Plancii res eae de quibus dixi tegere potuerunt ne tu in ea vita de qua iam dicam tot et tanta adiumenta huic honori fuisse mirere.

(*e*) O adulescentiam traductam eleganter, cui quidem cum quod licuerit obiciatur tamen id ipsum falsum reperiatur.

(*f*) Quae obtinebatur a C. Vergilio quocum me uno vel maxime cum vetustas tum amicitia cum mei fratris conlegia tum rei publicae causa sociarat.

THIRD AND FOURTH YEARS.

CLASSICAL HONOURS.

LATIN—TRANSLATION AT SIGHT.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

Translate:

(1) Oraque magnanimum spirantia paene virorum
In rostris iacuere suis: sed enim abstulit omnis,
Tamquam sola foret, rapti Ciceronis imago.
Tunc redeunt animis ingentia consulis acta
Iurataeque manus deprensaque foedera noxae
Patriciumque nefas extinctum: poena Cethegi
Deiectusque redit votis Catilina nefandis.
Quid favor aut coetus, pleni quid honoribus anni
Profuerant? sacris exculta quid artibus aetas?
Abstulit una dies aevi decus, ictaque luctu
Conticuit Latiae tristis facundia linguae.
Unica sollicitis quondam tutela salusque,
Egregium semper patriae caput, ille senatus
Vindex, ille fori, legum ritusque togaeque,
Publica vox saevis aeternum obmutuit armis.
Informes voltus sparsamque cruore nefando
Canitiem sacrasque manus operumque ministras
Tantorum pedibus civis proiecta superbis
Proculcavit ovans nec lubrica fata deosque
Respexit. Nullo luet hoc Antonius aevo.

Hoc nec in Emathio mitis victoria Perse,
Nec te, dive Syphax, non fecit in hoste Philippo;
Inque triumphato ludibria cuncta Iugurtha
Afuerant, nostraeque cadens ferus Hannibal irae
Membra tamen Stygias tulit inviolata sub umbras.

(2) Verum opinaris: destringor centumviralibus causis, quae me exercent magis quam delectant. Sunt enim pleraeque parvae et exilis: raro incidit vel personarum claritate vel negotii magnitudine insignis. Ad hoc pauci cum quibus iuvet dicere: ceteri audaces atque etiam magna ex parte adulescentuli obscuri ad declamandum huc transierunt, tam inreverenter et temere ut mihi Atilius noster expresse dixisse videatur sic in foro pueros a centumviralibus causis auspicari ut ab Homero in scholis. Nam hic quoque ut illic primum coepit esse quod maximum est. At Hercule ante memoriam meam (ita maiores natu solent dicere) ne nobilissimis quidem adulescentibus locus erat nisi aliquo consulari producente: tanta veneratione pulcherrimum opus colebatur. Nunc refractis pudoris et reverentiae claustris omnia patent omnibus, nec inducuntur sed inrumpunt. Sequuntur auditores actoribus similes, conducti et redempti: manceps convenitur: in media basilia tam palam sportulae quam in triclinio dantur: ex iudicio in iudicium pari mercede transitur.

(3) Dictum, iudices, est de decumano frumento, dictum de empto, extremum reliquum est de aestimato, quod quum magnitudine pecuniae tum iniuriae genere quemvis debet commovere, tum vero eo magis, quod ad hoc crimen non ingeniosa aliqua defensio, sed improbissima confessio comparatur. Nam quum ex senatus consulto et ex legibus frumentum in cellam ei sumere liceret, idque frumentum senatus, ita aestimasset, quaternis HS tritici modium, binis hordei, iste numero ad summam tritici adiecto tritici modios singulos cum aratoribus ternis denariis aestimavit. Non est in hoc crimen, Hortensi, ne forte ad hoc meditere, multos saepe viros bonos, fortes et innocentes, cum aratoribus et cum civitatibus frumentum, in cellam quod sumi oporteret, aestimasse et pecuniam pro frumento abstulisse. Scio quid soleat fieri, scio quid liceat. Nihil quod ante fuerit in consuetudine bonorum, nunc in istius facto reprehenditur.

(4) Optima nutricum nostris Lupa Martia rebus,
Qualia creverunt moenia lacte tuo!
Moenia namque pio conor disponere versu:
Heu mihi, quod nostro est parvus in ore sonus!
Sed tamen exiguo quodcunque e pectore rivi
Fluxerit, hoc patriae serviet omne meae.
Ennius hirsuta cingat sua dicta corona:
Mi folia ex hedera porrige, Bacche, tua,
Ut nostris tumefacta superbiat Umbria libris,
Umbria Romani patria Callimachi.
Scandentes si quis cernet de vallibus arces,
Ingenio muros aestimet ille meo.
Roma fave, tibi surgit opus: date candida cives
Omina, et inceptis dextera cantet avis.
Sacra diesque canam, et cognomina prisca locorum:
Has meus ad metas sudet oportet equus.

(5) Nec cogitandi, Sparse, nec quiescendi
In urbe locus est pauperi. Negant vitam
Ludimagistri mane, nocte pistores,
Aerariorum marculi die toto.
Hinc otiosus sordidam quatit mensam
Neroniana nummularius massa;
Illinc palucis malleator Hispanae
Tritum nitenti fuste verberat saxum.
Nec turba cessat entheata Bellonae,
Nec fasciato naufragus loquax trunco,
A matre doctus nec rogare Iudaeus,
Nec sulphuratae lippus institor mercis.
Numerare pigri damna qui potest somni,
Dicet quot aera verberent manus urbis,
Cum secta Colcho Luna vapulat rhombo.

THIRD AND FOURTH YEARS.

CLASSICAL HONOURS.

LATIN PROSE COMPOSITION.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

A.

I am charged with being an American. If warm affection towards those over whom I claim any share of authority be a crime, I am guilty of this charge. But I do assure you (and they who know me publicly and

privately will bear witness to me) that if ever one man lived more jealous than another for the supremacy of parliament and the rights of this imperial crown, it was myself. Many others, indeed, might be more knowing in the extent of the foundation of these rights; I do not pretend to be an antiquary, a lawyer, or qualified for the chair of professor in metaphysics. I never ventured to put your solid interests upon speculative grounds. My having constantly declined to do so has been attributed to my incapacity for such disquisitions; and I am inclined to believe it is partly the cause. I never shall be ashamed to confess that where I am ignorant I am diffident. I am, indeed, not very solicitous to clear myself of this imputed incapacity; because men, even less conversant than I am in this kind of subleties, and placed in stations to which I ought not to aspire, have, by the mere force of civil discretion, often conducted the affairs of great nations with distinguished felicity and glory.

B.

But while superstition is thus the inevitable and therefore the legitimate condition of an early civilization, the same causes that make it necessary render possible the growth of political liberty. Neither the love of freedom nor the capacity of self-government can exist in a great nation that is plunged in ignorance. Political liberty was in ancient times almost restricted to cities like Athens and Rome, where public life, and art, and all the intellectual influences that were concentrated in a great metropolis, could raise the people to an exceptional elevation. In the middle ages servitude was mitigated by numerous admirable institutions, most of which emanated from the Church; but the elements of self-government could only subsist in countries that were so small that the proceedings of the central government came under the immediate cognisance of the whole people.

THIRD AND FOURTH YEARS.

CLASSICAL HONOURS—CICERO'S VERRINE ORATIONS.

THURSDAY, APRIL 9TH, 1903:—AFTERNOON, 2 TO 5.

1. Translate:—

(1) Itaque magnus ille defensor et amicus eius tibi suffragatur, me oppugnat; aperte ab iudicibus petit ut tu mihi anteponare, et ait hoc se honeste sine ulla invidia ac sine ulla offensione contendere. 'Non enim', inquit, 'illud peto quod soleo, cum vehementius contendi, impetrare; reus ut absolvatur non peto, sed ut potius ab hoc quam ab illo accusetur, id peto. Da mihi hoc; concede quod facile est, quod honestum, quod non invidiosum; quod cum dederis, sine ullo tuo periculo, sine infamia illud dederis; ut is absolvatur cuius ego causa laboro.' Et ait idem, ut aliquis metus adiunctus sit ad gratiam, certos esse in consilio quibus ostendi tabellas velit; id esse perfacile; non enim singulos ferre sententias, sed universos constituere; ceratam uni cuique tabellam dari cera legitima, non illa infami ac nefaria. Atque is non tam propter Verrem laborat quam quod eum minime res tota delectat; videt enim, si a pueris nobilibus, quos adhuc elusit, si a quadruplatoribus, quos non sine causa contempsit semper ac pro nihilo putavit, accusandi voluntas ad viros fortes spectatosque homines translata sit, sese in iudiciis diutius dominari non posse.

(2) 'Fecit fecerit'? quis umquam edixit isto modo? quis umquam eius rei fraudem aut periculum proposuit edicto quae neque post edictum reprehendi neque ante edictum provideri potuit? Iure, legibus, auctoritate omnium qui consulebantur, testamentum P. Annius fecerat non improbum, non inofficiosum, non inhumanum: quodsi ita fecisset, tamen post illius mortem nihil de testamento illius novi iuris constitui oporteret. Voconia lex te videlicet delectabat. Imitatus esses ipsum illum Voconium, qui lege sua hereditatem ademit nulli neque virgini neque mulieri: sanxit in posterum, qui post eos censores census esset, ne quis heredem virginem neve mulierem faceret. In lege Voconia non est 'Fecit fecerit', neque in ulla praeteritum tempus

reprehenditur nisi eius rei quae sua sponte scelerata et nefaria est ut, etiamsi lex non esset, magnopere vitanda fuerit. Atque in his ipsis rebus multa videmus ita sancta esse legibus ut ante facta in iudicium non vocentur.

(3) Videte maiorum diligentiam, qui nihildum etiam istius modi suspicabantur, verum tamen ea, quae parvis in rebus accidere poterant, providebant. Neminem, qui cum potestate aut legatione in provinciam esset profectus, tam amentem fore putaverunt, ut emeret argentum: dabatur enim de publico: ut vestem: praebebatur enim legibus: mancipium putarunt, quo et omnes utimur et non praebetur a populo. Sanxerunt, ne Quis Emeret Nisi in Demortui Locum. Si qui Romae esset demortuus? Immo, si quis ibidem. Non enim te instruere domum tuam voluerunt in provincia, sed illum usum provinciae supplere.

(4) Urbem Syracusas maximam esse Graecarum, pulcherrimam omnium, saepe audistis. Est, iudices, ita, ut dicitur. Nam et situ est quum munito tum ex omni aditu, vel terra vel mari, praeclaro ad aspectum, et portus habet prope in aedificatione aspectuque urbis inclusos: qui quum diversos inter se aditus habeant, in exitu coniunguntur et confluunt. Eorum coniunctione pars oppidi, quae appellatur Insula, mari disiuncta angusto, ponte rursus adiungitur et continetur. Ea tanta est urbs, ut ex quattuor urbidus maximis constare dicatur: quarum una est ea, quam dixi, Insula, quae duobus portibus cincta, in utriusque portus ostium aditumque proiecta est, in qua domus est, quae Hieronis regis fuit, qua praetores uti solent.

(5) Locutus erat liberius de istius improbitate atque nequitia. Quod isti simul ac renuntiatum est, hominem iubet Lilybaeum vadimonium Venerio servo promittere. Promittit. Lilybaeum venitur. Cogere eum coepit, quum ageret nemo, nemo postularet, sponsionem [duorum] milium numum facere cum lictore suo, ni Furtis Quaestum Faceret. Recuperatores se de cohorte sua dicebat daturum. Servilius et recusare et deprecari, ne iniquis iudicibus, nullo adversario, iudicium capitis in se constitueretur. Haec quum maxime loqueretur, sex lictores circumsistunt valentissimi et ad pulsandos verberandosque homines exercitatis-

simi: caedunt acerrime virgis: denique proximus lictor, de quo iam saepe dixi, Sextius, converso baculo, oculos misero tundere vehementissime coepit. Itaque ille, quum sanguis os oculosque complesset, concidit: quum illi nihilo minus iacenti latera tunderent, ut aliquando spondere se diceret. Sic ille adfectus illim tum pro mortuo sublatus perbrevi postea est mortuus. Iste autem homo Venerius, adfluens omni lepore ac venustate, de bonis illius in aede Veneris, argenteum Cupidinem posuit. Sic etiam fortunis hominum abutebatur ad nocturna vota cupiditatum suarum.

2. Translate with any necessary notes:—

(1) Sin praetermittes, qualis erit tua ista accusatio, quae domestici periculi metu certissimi et maximi criminis non modo suspicionem verum etiam mentionem ipsam pertimescat.

(2) Quartum quem sit habiturus non video, nisi quem forte ex illo grege moratorum, qui subscriptionem sibi postularunt, cuicumque vos delationem dedissetis: ex quibus alienissimis hominibus ita paratus venis ut tibi hospes aliquis sit recipiendus.

(3) Nunc id quod facimus, *si* ea ratione facimus ut malitiae illorum consilio hostro occurramus, necessario fieri intellegat.

(4) Accessi enim ad invidiam indiciorum levandam vituperationemque tollendam ut, cum haec res pro voluntate populi Romani esset iudicata, aliqua ex parte mea diligentia constituta auctoritas iudiciorum videretur, postremo ut esset hoc iudicatum, ut finis aliquando iudiciariae controversiae constitueretur.

(5) Verum, ut opinor, Glaucia primus tulit ut comperendinaretur reus; antea vel iudicari primo poterat vel amplius pronuntiari.

(6) Si habuisset iste edictum, quod ante istum et postea omnes habuerunt, possessio Minuciae genti esset data: si quis testamento se heredem esse arbitraretur, quod tum non exstaret, lege ageret in hereditatem, aut, pro praede litis vindiciarum cum satis accepisset, sponsionem faceret et ita de hereditate certaret.

(7) Refert rem ille ad senatum: vehemeter undique reclamatur. Ne multa, iterum iste ad illos aliquanto post venit, quaerit continuo de signo. Respondetur ei

senatum non permittere: poenam capitis constitutam, si iniussu senatus quisquam attigisset: simul religio commemoratur.

(8) Cognoscentur enim omnia istius aera illa vetera, ut non solum in imperio, verum etiam in stipendiis qualis fuerit intelligatis.

(9) Ut adeas, tantum dabis: ut tibi cibum vestitumque intro ferre liceat, tantum. Nemo recusabat. Quid? ut uno ictu securis adferam mortem filio tuo, quid dabis? ne diu crucietur? ne saepius feriatur? ne cum sensu doloris aliquo spiritus auferatur?

3. Give the meaning of *vasa colligere, sarta tecta exigere, absentis nomen recipere, litterae commendaticiae, obtundere aures, gramineae hastae, argentariam facere, in suis nummis esse, lex maiestatis, de consilii sententia, idiotes, lautumiae, mystagogus.*

4. Discuss briefly the use and limits of conjectural emendation.

THIRD AND FOURTH YEARS.

LATIN (HONOURS).

PLAUTUS: *Captives and Rudens;* TERENCE: *Andria and Phormio.*

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 1.

1. Translate:

(*a*) ER. Ain tu? dubium habebis etiam, sancte quom ego iurem tibi?
Postremo, Hegio, si parua iuri iurandost fides,
Vise ad portum. HE. Facere certumst: tu intus cura quod opus est:
Sume, posce, prome quiduis: te facio cellarium.
ER. Nam hercle, nisi ego manticinatus probe ero, fusti pectito.
He. Aeternum tibi dapinabo uictum, si uera autumas.
ER. Vnde id? He. A me meoque gnato. ER. Sponden tu istut? HE. Spondeo.
—CAPTIVES, 892-900.

(*b*) AMP. Quid mihi meliust, quid magis in remst,
quam corpore vitam ut secludam?
Ita male vivo atque ita mihi multae in pectore
sunt curae exanimales:
Ita res se habent: vitae hau parco: perdidi
spem qua me oblectabam.
Omnia iam circumcursaui atque omnibus late-
bris perreptavi
Quaerere conservam: voce, oculis, auribus ut
uestigarem.
Neque eam usquam invenio neque quo eam ne-
que qua quaeram consultumst,
Neque quem rogitem responsorem quemquam
interea convenio.
Neque magis solae terrae solae sunt quam hace
loca atque haec regiones.
Neque si uiuit eam uiua umquam quin inveniam
desistam.

—RUDENS, 220-228.

(*c*) CH. Hoccinest credibile, aut memorabile;
tanta vecordia innata cuiquam ut siet,
ut malis gaudeant, atque ex incommodis
alterius sua ut comparent commoda? Ah
idne est verum? Immo id est genus hominum
pessumum, in
denegando modo queis pudor paulum adest:
post ubi tempus promissa iam perfici,
tum coacti necessario se aperiunt:
et timent: et tamen res premit denegare:
ibi tum eorum inpudentissima oratio est:
quis tu es? quis mihi es? cur meam tibi?
Heus, proxumus sum egomet mihi.
Attamen, ubi fides, si roges,
nil pudet: hic, ubi opust, non verentur: illic ubi
nil opust, ibi verentur.
Sed quid agam? adeamne ad eum, et cum eo
iniuriam hanc expostulem?
ingeram mala multa? Atque aliquis dicat, nihil
promoveris.

—ANDRIA, 625-640.

ANTIPHO.

(*d*) Laetis sum, ut meae res sese habent, fratri obtigisse quod volt.
Quam scitumst, eiusmodi parare in animo cupiditates,
quas, quum res adversae sient, paulo mederi possis?
Hic simul argentum repperit, cura sese expedivit:
ego nullo possum remedio me evolvere ex his turbis,
quin si hoc celetur, in metu, sin patefit, in probro sim.
Neque me domum nunc reciperem, ni mi esset spes ostenta
huiusce habendi. Sed ubinam Getam invenire possim, x
ut rogem, quod tempus conveniundi patris me capere iubeat?

—PHORMIO, 820-828.

2. Write critical and explanatory notes on the following passages:

(*a*) Eiulatione haud opus est; multa oculis multa miraclitis.
(*b*) HE. Facito ergo ut Acherunti clueas gloria,
TYN. Qui per virtutem peritat, non interit.
HE. Quando ego te exemplis pessimis cruciavero
Atque ob sutelas tuas te Morti misero
Vel te interiisee vel periisse praedicent.
(*c*) Nominandi istorum tibi erit magis quam edundi copia.
(*d*) Neque exitium exitiost neque adeo spes, quae hunc me aspellat metum.
(*e*) PH. At quem virum! Quem ego viderim in vita optumum.
GE. Videas te atque illum, ut narras!
(*f*) Homo confidens: qui illum di omnes perduint!
(*g*) Di tibi omnes id quod es dignus duint!
(*h*) Interea mulier quaedam abhinc triennium
Ex Andro commigravit huc viciniae.
(*i*) Egon propter me illam decipi miseram sinam.

Quae mihi suom animum atque omnem vitam credidit,
Quam ego animo egregie caram pro uxore habuerim.

(*k*) Facile omnes, quom valemus, recta consilia aegrotis damus.
Tu sic hic sis, aliter sentias.

(*l*) Adeo videmur vobis esse idonei,
In quibus sic inludatis.

(*m*) Nimio hominum fortunae minus miserae memorantur
Quam qui sciunt experiundo eis uis datur acerbum.

(*n*) Equidem me ad velitationem exerceo;
Nam omnia corusca prae tremore fabulor.

3. What were the Greek originals of the Rudens and the Andria? Quote in proof, one or more lines from the prologues.

4. What was the origin of the didascaliae prefixed to the plays of Terence?

Translate and explain:

Acta Ludis Romanis L. Postumio Albino L. Cornelio Merula Aedilib. Curulib. Egere L. Ambivius Turpio, L. Atilius Praenestinus. Modos fecit Flaccus Claudi tibiis inparib, Tota graeca Apollodoru Epidicazomenos. Acta est IIII. C. Fannio M. Valerio Coss.

To which of the plays was this notice prefixed?

5. Determine the metres of 1. (*a*), 1. (*b*) lines 220, 230, 1. (*c*) lines 625, 626, 636, and 1. (*d*).

Remark on the influence of accent upon Comic poetry.

CLASSICAL HONOURS.

EPIC POETRY; VIRGIL AND LUCAN.

TUESDAY, APRIL 7TH, 1903:—AFTERNOON, 2 TO 5.

1. Translate:—

At vero ingentem quatiens Mezentius hastam
turbidus ingreditur campo. quam magnus Orion
cum pedes incedit medii per maxuma Nerei
stagna viam scindens, humero supereminet undas,

aut summis referens annosam montibus ornum
ingrediturque solo et caput inter nubila condit:
talis se vastis infert Mezentius armis.
huic contra Aeneas speculatus in agmine longo
obvius ire parat. manet imperterritus ille
hostem magnanimum opperiens et mole sua stat;
atque oculis spatium emensus quantum satis hastae;
dextra mihi deus et telum quod missile libro
nunc adsint. voveo praedonis corpore raptis
indutum spoliis ipsum te, Lause, tropaeum
Aeneae. dixit stridentemque eminus hastam
iecit, at illa volans clipeo est excussa proculque
egregium Antoren latus inter et ilia figit,
Herculis Antoren comitem qui missus ab Argis
haeserat Euandro atque Itala consederat urbe,
sternitur infelix alieno volnere, caelumque.
aspicit et dulces moriens reminiscitur Argos.

2. Translate, adding a brief comment or quoting parallel passages where necessary:—

(*a*) Cuius olorinae surgunt de vertice pennae,
crimen amor vestrum formaeque insigne paternae.
(*b*) Totumque adlabi classibus aequor.
(*c*) In manibus Mars ipse viris.
(*d*) Sed non et figere contra
est licitum magnique femur perstrinxit Achatae.
(*e*) Aspera quis natura loci dimittere quando
suasit equos.
(*f*) Pelagus Troiamne petemus.
(*g*) Quadriiugis in equos adversaque pectora tendit.
(*h*) Si mora praesentis leti tempusque caduco
oratur iuveni meque hoc ita ponere sentis,
tolle fuga Turnum atque iustantibus eripe fatis
(*i*) Quod ut o potius formidine falsa
ludar et in melius tua qui potes orsa reflectas.
(*k*) Ille pedem referens et inutilis inque ligatus.
(*l*) Ingentem gemitum tunsis ad sidera tollunt
pectoribus.
(*m*) Cui neque fulgor adhuc necdum sua forma recessit.
(*n*) Vixet cui vitam deus aut sua dextra dedisset.
(*o*) Meritis vacat hic tibi solus
fortunaeque locus.

(*p*) Devictam Asiam subsedit adulter.

(*q*) Spem si quam adscitis Aetolum habuistis in armis
ponite. spes sibi quisque; sed haec quam angusta videtis.

(*r*) Sat funera fusi
vidimus.

(*s*) Proinde tona eloquio, solitum tibi.

(*t*) Cetera, qua iusso, mecum manus inferat arma.

(*u*) Prospexit tristi mulcatam morte Camillam.

3. Translate:—

Hae facient dextrae quidquid non expleat aetas
ulla nec humanum reparet genus omnibus annis
ut vacet a ferro. gentes Mars iste futuras
obruet et populos aevi venientis in orbem
erepto natale feret. tunc omne Latinum
fabula nomen erit; Gabios. Veiosque Coramque
pulvere vix tectae poterunt monstrare ruinae,
Albanosque lares Laurentinosque penates
rus vacuom quod non habitet nisi nocte coacta
invitus questusque Numam iussisse senator.
non aetas haec carpsit edax monumentaque rerum
putria destituit: crimen civile videmus
tot vacuas urbes. generis quo turba redacta est
humani? toto populi qui nascimur orbe
nec muros implere viris nec possumus agros;
urbs nos una capit: vincto fossore coluntur
Hesperiae segetes: stat tectis patris avitis
in nullos ruitura domus: nulloque frequentem
cive suo Romam sed mundi faece repletam
cladis eo dedimus ne tanto in tempore bellum
iam posset civile geri.

4. Translate, adding a comment or parallel passage where necessary:—

(*a*) crastina dira quies et imagine maesta diurna
undique funestas acies feret undique bellum.

(*b*) Pura venerabilis aeque
quam currus ornante toga.

(*c*) Hoc pro tot meritis solum te, Magne, precatur
uti se Fortuna velis.

(*d*) Et trabibus mixtis avidos Pythonas aquarum
detulit.

(*e*) Impia tam saeve gesturus bella litasti.
(*f*) Eripe victori gentes et sanguine mundi
fuso, Magne, semel totos consume triumphos.
(*g*) Formidine mersa.
prosilit hortando melior fiducia volgo.
(*h*) Invidia regnate mea.
(*i*) Ignoti iugulum tamquam scelus imputat hostis.
(*k*) De Brutis, Fortuna, queror.
(*l*) Nondum attigit arcem
iuris et humanum culmen quo cuncta premuntur
egressus meruit fatis tam nobile letum.
(*m*) Ora parentis
quis laceret nimiaque probet spectantibus ira
quem iugulat non esse patrem.
(*n*) Felix se nescit amari.
(*o*) Invidet igne rogi miseris.
(*p*) Hesperiae clades et flebilis unda Pachyni
et Mutina et Leucas puros fecere Philippos.

FOURTH YEAR.

CLASSICAL HONOURS.

LATIN—PRIVATE READINGS.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

N.B.—(*A and B to be shown up in separate books.*)

A.

1. Translate:—

(*a*) Quamvis copiose haec diceremus si res postularet quam multa quam varia quanta spectacula animus in locis caelestibus esset habiturus. quae quidem cogitans soleo saepe mirari non nullorum insolentiam philosophorum qui naturae cognitionem admirantur eiusque inventori et principi gratias exsultantes agunt eumque venerantur ut deum; liberatos enim se per eum dicunt gravissimis dominis terrore sempiterno et diurno ac nocturno metu. quo terrore? quo metu? quae est anus tam delira quae timeat ista quae vos videlicet si physica non didicissetis timeretis? "*Acherunsia templa Orci pallida leti obnubila tenebris loca.*"

Non pudet philosophum in eo gloriari quod haec non timeat et quod falsa esse cognoverit? E quo intelligi potest quam acuti natura sint quoniam haec sine doctrina crediturí fuerunt. Praeclarum autem nescio quod adepti sunt quod didicerunt se cum tempus mortis venisset totos esse perituros. quod ut ita sit, nihil enim pugno, quid habet ista res aut laetabile aut gloriosum?

(*d*) Ego vero illi maximam gratiam habeo qui me ea poena multaverit quam sine mutuatione et sine versura possem dissolvere.

(*c*) Suum illud nihil ut adfirmet tenet ad extremum.

(*d*) Rationem illi sententiae suae non fere reddebant nisi quid erat numeris aut descriptionibus explicandum.

2. Quote the epitaph on Ennius and discuss any various readings.

B.

1. Translate:

Atque idem quanto in odio postea suis illis ipsis fuit, per quos in altiorem locum adscenderat! Neque iniuria. Facite enim, ut non solum mores eius et arrogantiam, sed etiam vultum atque amictum, atque illam usque ad talos demissam purpuram recordemini. Is, quasi non esset ullo modo ferendum, se ex iudicio discessisse victum, rem ab subselliis in Rostra detulit. Et iam querimur saepe, hominibus novis non satis magnos in hac civitate esse fructus? Nego usquam umquam fuisse maiores: ubi, si quis ignobili loco natus ita vivit, ut nobilitatis dignitatem virtute tueri posse videatur, usque eo pervenit, quoad cum industria eum innocentia prosecuta est; si quis autem hoc uno nititur, quod sit ignobilis, procedit saepe longius, quam si idem ille esset cum iisdem suis vitiis nobilissimus. Ut Quintius (nihil enim dicam de ceteris) si fuisset homo nobilis, quis eum cum illa superbia atque intolerantia ferre potuisset? Quod eo loco fuit, ita tulerunt, ut, si quid haberet a natura boni, prodesse ei putarent oportere, superbiam autem atque arrogantiam eius deridendam magis arbitrarentur propter humilitatem hominis, quam pertimescendam.

2. Translate, with any necessary notes:—

(1) Neque umquam illa ita de suo scelere et immanitate audiet, ut naturae nomen amittat.

(2) Ex petulanti atque improbo scurra, in discordiis civitatis, ad eam columnam, ad quam multorum saepe conviciis perductus erat, tum suffragiis populi pervenerat.

(3) Atque etiam ipse conditor totius negotii Guttam adspergit huic Bulbo.

(4) Si ideo quia subscripserint: videte, quid agatis, ne censorium stilum, cuius mucronem multis remediis maiores nostri retuderunt, aeque posthac atque illum dictatorium gladium pertimescamus.

(5) Habitus ne hoc quidem umquam recusavit, quo minus vel ea lege rationem vitae suae redderet, qua non teneretur.

3. Translate:

Sed et illa ex Latinis conversio multum et ipsa contulerit. Ac de carminibus quidem neminem credo dubitare, quo solo genere exercitationis dicitur usus esse Sulpicius. Nam et sublimis spiritus attollere orationem potest, et verba poetica libertate audaciora non praesumunt eadem proprie dicendi facultatem; sed et ipsis sententiis adicere licet oratorium robur et omissa supplere et effusa substringere. Neque ego paraphrasin esse interpretationem tantum volo, sed circa eosdem sensus certamen atque aemulationem. Ideoque ab illis dissentio qui vertere orationes Latinas vetant, quia optimis occupatis, quidquid aliter dixerimus, necesse sit esse deterius. Nam neque semper est desperandum aliquid illis quae dicta sunt melius posse reperiri, neque adeo ieiunam ac pauperem natura eloquentiam fecit ut una de re bene dici nisi semel non possit: nisi forte histrionum multa circa voces easdem variare gestus potest, orandi minor vis, ut dicatur aliquid post quod in eadem materia nihil dicendum sit. Sed esto neque melius quod invenimus esse neque par, est certe proximis locus.

4. Translate with any necessary notes:—

(1) Ceterum nitor et summa in excolendis operibus manus magis videri potest temporibus quam ipsis defuisse: virium tamen Attio plus tribuitur, Pacuvium videri doctiorem qui esse docti adfectant volunt.

(2) Ideoque qui horride atque incomposite quidlibet illud frigidum et inane extulerunt, antiquis se pares credunt; qui carent cultu atque sententiis, Attici sunt scilicet; qui praecisis conclusionibus obscuri, Sallustium atque Thycydiden superant; tristes ac ieiuni Pollionem aemulantur; otios et supini, si quid modo longius circumduxerunt, iurant ita Ciceronem locuturum fuisse.

(3) Sed si forte aliqui inter dicendum offulserit extemporalis color, non superstitiose cogitatis demum est inhaerendum. Neque enim tantum habent curae ut non sit dandus et fortunae locus, cum saepe etiam scriptis ea quae subito nata sunt inserantur.

5. Give the meaning of the following words and phrases:—

Multam committere, sequester, advocatus, aucupari, decuriae iudicum, imagines, litis aestimatio, obsignatores, verbis conceptis peierare, aerarius, aliud agere, calumnia, edictum praetoris, subsortitio, praevaricari accusationi, vetustatem perferre, altercatio, dilectum agere, communes loci, circulatoria volubilitas, cothurnus, pedestris oratio.

FOURTH YEAR.

CLASSICAL HONOURS.

LATIN.

PRIVATE READINGS: PLAUTUS, LIVY AND MERRY'S FRAGMENTS.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

A.

I. PLAUTUS, TRINUMMUS.

1. Translate:—
   (*a*) vs. 198-205.
   (*b*) vs. 998-1007.
2. Translate and comment on the following passages:
   (*a*) Nam hic nimium morbus mores invasit bonos
   Ita plerique omnis iam sunt intermortui.
   (*b*) Multas res simitu in meo corde vorso,
   Multum in cogitando dolorem indipiscor.
   Egomet me coquo et macero et defetigo:

Magister mihi exercitor animus nunc est.

(*c*) Sed Campans genus
Multo Syrorum iam antidit patientia.

(*d*) Nam beneficium homini proprium quod datur, prosum perit.

3. How is the term "prologue" defined by Aristotle? What two purposes did the prologue serve in Roman Comedy? Remark on the character of the prologues to the Trinummus.

II. Livy, Book II.

1. Translate ch. 58, §§ 3-9.

2. Translate:—

Quattuor et viginti lictores apparere consulibus, et eos ipsos plebis homines. Nihil contemptius neque infirmius, si sint contemnant; sibi quemque ea magna atque horrenda facere. His vocibus alii alios cum incitassent, ad Voleronem, de plebe hominum, quia, quod ordines duxisset, negaret se militem fieri debere, lictor missus est a consulibus.

(*a*) Distinguish between *lictor* and *viator*.

(*b*) Remark on the meaning of *apparere*.

3. Comment on (*a*) primo pugnatum *ad Spei* sit aequo Marte, iterum ad *portam Collinam:* (*b*) Chap. 27, cum.. ..dicere, (§1), tergiversari (§3), dixisset (§10): (*c*) Ille primum dicitur *vindicta* liberatus: (*d*) *Ludi* forte *ex instauratione magni* Romae parabantur: (*e*) His civitas data agerque trans Anienem; vetus Claudia tribus, additis postea novis tribulibus, qui ex eo venirent agro appellata.

4. Point out some inconsistencies in Livy's narrative (Bk. II.). How may they be accounted for?

B.

MERRY'S FRAGMENTS.

1. Translate, adding a line of comment where necessary:—

(*a*) Simul ac dacrimas de ore noegeo detersit.

(*b*) Ingenio arbusta ubi nata sunt, non obsita.

(*c*) Scopas atque verbenas sagmina sumpserunt.

(*d*) Priamo vi vitam evitari.

(*e*) Haec tu etsi perverse dices facile Achivos flexeris;
nam opulenti cum locuntur pariter atque ignobiles
eadem dicta eademque oratio aequa non aeque valet.

(*f*) Paula mea, amabo, pol tuam ad laudem addito praefiscini.

Can you quote a parallel?

(*g*) Praeterea omne iter est hoc labosum atque lutosum.

Emend this line.

(*h*) O lapathe ut iactare.

(*i*) Acipensere cum decumano.

(*k*) Hoc nolueris et debueris te
si minus delectat quod τεχνίον Isocratium est
ληρῶ desque simul totum et συμμειρακιῶδες
non operam perdo.

What is the meaning?

2. Translate, adding where you can a philological note:—topper, homones, (what other spelling is found?), manubias, redhostis, puer, casci, stlataria, insece, falae, vitulans, obbitere, praeterpropter, nepa, florus, averruncassint, calvitur, incilet, spisse, lactat, inibi, numero, bulga, scriblitarius, caperata, ericius, casnares.

3. State whence the following quotations are taken:—

(*a*) Oderint dum metuant.

(*b*) Dimidiate Menander.

(*c*) Laetus sum laudari me abs te pater a laudato viro

(*d*) Male vincit quem post paenitet victoriae.

(*e*) Quae Corinthi arcem altam habetis matronae opulentae optimates.
multi suam rem bene gessere, etc.

Can you quote the original of the last?

THIRD AND FOURTH YEARS.

COMPARATIVE PHILOLOGY.

MONDAY, APRIL 6TH, 1903:—AFTERNOON, 2 TO 5.

N.B.—*A and B to be sent up in different books.*

A.

(N.B.—*Full marks may be obtained in this section by correct answers to 5 questions of which, however, No. 3 must be one.*)

1. Divide the two Indo-European languages into groups and introduce the following Prussian, Welsh, Roumanian, Gothic, modern Norwegian, Slovakian.

Name any characteristic features of Sanskrit, Greek, Latin, Celtic, Slavonic.

2. Write out the Pres. and Perfect of "bhid" in Sanskrit and of the corresponding root in Germanic; also in Germanic the primitive Pres. and Perfect of root "lith" "to go," and show how Verner's law is illustrated thereby. Give other illustrations of the same law.

3. State what are the most recent views about Ablaut in the Indo-European languages. Shew how the following words are connected:—

(*a*) *βέλεμνον* + *βλῆναι*.

(*b*) *γόνυ* + Gothic kniu (for kneu).

(*c*) Sinn (Germ.) + *νοῦς*.

(*d*) *ἔλαφος* + lamb.

(*e*) *ἐλάτη* + O. H. G. linda.

(*f*) *ἄργυρος* + rajatam (skr.=silver).

(*g*) *εὔκηλος* + *ἔκηλος*.

(*h*) augere + wax (=to grow).

(*i*) *ἐγώ* + *μέ*.

(*k*) *εὔχομαι* + voveo.

(*l*) *φεύγω* + *φέβομαι*.

(*m*) *ἄσχετος* + *ἐκτός* (why not *σχετός*?)

(*n*) *ἄλευρον* + meal.

(*o*) *πῖθι* + *πέπωκα*,

(*p*) *ἡδί—ων* + suadē-re.

4. Comment on the influence of analogy in the following forms:—

ἡδέσι, φεροίατο, ἐσπόμην, ποθέσομαι, πολίτου, πόδεσσι, πηγαίνω, ὀκτώ (Greek Dial.), ἑξακόσιοι, πόληος, νύμφησι, voster, noctu, μηκέτι, ἔρρηξα, ἀλκυών, μήτηρ, one; what would you expect in each case?

5. Describe with examples the treatment of short *e* in Latin.

Connect the vocalisation of the following words:—

(*a*) ἀγέομαι + seek.

(*b*) haedus + goat; give the Ags. and Gothic.

(*c*) death + Tod (Germ.); what is the Gothic?

(*d*) duco + tiuha (Goth.).

(*e*) rex + rajan.

(*f*) needle + Nadel (Germ.). Distinguish this *ee* from *ee* in Seek.

(*g*) hostis + gesti. (Pl. O.H.G.).

(*h*) Statio + sthitas (Skr.).

6. Explain what is meant by Sandhi and give examples of double forms in Greek which may be explained thereby.

B.

1. Remark on the origin of the following forms:

εἴχες, τρεῖς, δήμου, coalesco, claudo, κτείνω, ἐλαχύς. κάββαλε, attigi, semestris, παίς, πᾶς, βροτός, sumpsi, nouos, ero, Ζεύς.

2. οἶκος Give the root of this word, its stem, and the origin of the various case-forms in the plural.

3. What explanations have been offered of the short *a* in the termination of the nom. sing. of *A*-stems?

4. In what forms does the original locative case appear in Greek and Latin?

5. Explain the origin of the stem and termination in the following forms: honor, miles, sermo, πόδα, πεδεμ, πατρί, patri, πολιεσσι, νεως, navis, ille, hic; vellem, moneam, οἶδάς, ἔδωκα, dixi, ἐλύσατε, amabam, sumus, ἴμεν, sequeris.

6. Remark on the formation of the Latin perfect in its various forms.

7. What is the probable origin of the stem of the Greek subjunctive in thematic and unthematic verbs?

8. Enumerate, with explanation where possible, the forms of the operative in Greek and Latin.

ENGLISH LANGUAGE AND LITERATURE

FIRST YEAR.

ENGLISH LITERATURE AND HISTORY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.30.

(*Parts A and B must be written in separate books.*)

A.

1. Give a short account of the origin of the English essay and its development up to the time of Dryden. Note any foreign influences which helped to determine this development.

2. Give the substance of any one of Bacon's essays, and make this the basis of a criticism of his style.

3. What special contribution to English essay literature was made by each of the following? Give some leading characteristic of the style of each, and say how he influenced later writers: Sir Thomas Browne, Bishop Hall, Sir William Temple, Oliver Goldsmith.

B.

Answer any three of the first five questions. The sixth question is to be answered without alternative.

1. Describe the career and conquests of Alexander the Great *or* the last age of the Roman Republic.

2. What do you know of the relations between Empire and Papacy during the Middle Ages?

3. Indicate the nature of the chief changes which followed the Crusade *or* give some account of the struggle between England and France, 1338-1453.

4. Discuss the rise of Holland *or* the character of the Thirty Years' War.

5. Outline the career of Peter the Great *or* that of Napoleon I.

6. Make brief notes on: the reforms of Solon; the battle of Leuctra, the second Samnite War; the Roman Empire under Diocletian; Theodoric; the Third Crusade; the Great Schism; the Confession of Augsburg; the Congress of Vienna; the Revolution of 1848.

FIRST YEAR.

ENGLISH LANGUAGE AND COMPOSITION.

THURSDAY, APRIL 9TH, 1903:—2.30 TO 5.30 P.M.

1. Write out the following in modern English, adding explanatory notes where they are required:—

A.

On this gær wærd the king Stephen ded & bebyried ther his wif & his sune wæron bebyried æt Fauresfeld. that minstre hi makeden. Tha the king was ded. tha was the eorl beionde sæ. & ne durste nan man don other bute god for the micel eie of him. Tha he to Engleland com. tha was he underfangen mid micel wurtscipe. & to king bletcæd in Lundene on the Sunnendæi beforen midwinterdæi, & held thær micel curt.

B.

Where is it groundid expressli in scripture, that men mowe lete schaue her berdis? and how dare thei so lete, sithen it can not be founde expressli in holi scripture that thei oughten so lete, and namelich sithen it is founde in holi scripture that men leten her berdis growe withoute schering or schauyng, and also sithen it was the oolde usage thorugh al the world in cristendom?

C.

Now the thunder-thumping Iove transfused his dotes into your excellent formositie, which have with your resplendent beames thus segregated the enmity of these rurall animals.

D.

He that commeth lately out of France, will talke Frenche Englishe, and never blush at the matter. Another choppes in with English Italianated, and applieth the Italian phrase to our English speaking. I know them that thinke Rhetorike to stand wholie upon darke wordes, and he that can catche an ynkehorne terme by the taile, hym thei compt to be a fine Englishman, and a good Rhetorician.

E.

In al the gramerscoles of Engelond children leueth Frensch & construeth & lurneth an Englysch, & habbeth ther-by avauntage in on syde & desavauntage yn another; here avauntage ys that a lurneth here gramer yn lasse tyme than children were ywoned to do—disavauntage ys that now children of gramerscole conneth no more Frensch than can here lift heele, & that ys harm for ham, & a scholle passe the se & travayle in strange londes, & in meny caas also. Also gentil men habbeth now moche yleft for to teche here childern Frensch.

2. State what you know of the date and authorship of the passages quoted.

3. Explain what is meant by Latin words of the First, Second, Third, and Fourth Periods, and give examples selected from the above extracts.

COMPOSITION.

(*Write this part of the Paper in a separate book.*)

1. Explain and illustrate:—Simple Barbarism, Colloquialism, Localism, in the use of words.

2. State clearly the nature and use of the Balanced Sentence. Give an example.

3. Correct, or improve, the *expression* of each of the following examples:

(*a*) That, and the society of evil companions, was the cause of his ruin.

(*b*) River-bed diggings is an important branch of placer-mining that has been worked only within the past year.

(*c*) I received the letter you wrote yesterday, and without a moment's delay, proceeded at once to our agent's office, though it was raining at the time, and the clerk said he had just telegraphed his acceptance.

(*d*) Youth is delighted with applause, because it is considered as the earnest of some future good, and because the prospect of life is far extended; but to me, who am now declining to decrepitude, there is little to be feared from the malevolence of men, and yet less to be hoped from their affection or esteem.

4. Write an essay of not less than two pages on any *one* of the following subjects:—

A. The Tatler.

B. Plagiarism.

C. Dreams.

SECOND YEAR.

ENGLISH LITERATURE.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

1. Describe the hall *Heorot*.

2. Write on Merlin in connection with Nennius and Geoffrey of Monmouth.

3. Describe Arthur's appearance, character and daily life, and also the customs of his court as given in French Chivalric romance.

4. Mention comic episodes in the Mysteries. Connect with precision the Mysteries with the Moralities, Give an outline of some Moral play.

5. State and illustrate (avoiding a narrative outline of any one piece) the various features of Chaucerian vision-poetry.

6. Give some account of Petrarch. Make a note on Boccaccio and "tragedies."

7. What does the *Chasteau d'Amour* illustrate? Enter into some particulars.

8. Glance at Roger Bacon's reading and write a paragraph on his scientific views and the inventions attributed to him.

9. (*a*) Describe Chaucer's Knight *or* Monk and make a note when you think one necessary, (*b*) write on the Romaunt of the Rose and also on its connections with Chaucer.

10. *Confessio Amantis:* its relation to (*a*) Chaucer, (*b*) the Romaunt of the Rose, (*c*) Brunetto Latini. Comment on its framework. Was Gower an accurate scholar?

SECOND YEAR.

ENGLISH LITERATURE AND COMPOSITION.

THURSDAY, APRIL 9TH, 1903:—AFTERNOON, 3 TO 6.

1. Give some account of the author of the Vision of Piers the Plowman and of his views.

2. (*a*) Give a list of English and Scotch Chaucerians, name one work of each and very briefly indicate its character.

(*b*) Treat the Spenserians in the same way.

3. Write on the Renaissance movement at the English Universities.

4. Write on Tottel's Miscellany.

5. Write on Spenser as reflecting;

(*a*) Italian influence;

(*b*) Contemporary history.

ENGLISH COMPOSITION.

(*To be written in a separate book.*)

Write an essay of about two pages on one of the following subjects:

(*a*) The French period of our Literature.

(*b*) One of Tennyson's Arthurian Idylls.

(*c*) The study of English Literature.

SECOND YEAR.

ENGLISH LITERATURE.

(*For Affiliated Colleges.*)

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

1. Into what great periods may English Literature be divided? Give the subdivision of one of them.

2. Write about a page on *Beowulf*, confining yourself as little as possible to an outline of the poem. What do you know concerning Cynewulf?

3. Trace the development of the Arthur story.

4. Give some account of Chaucer's life. Show that the pilgrims of the Canterbury Tales reflect Chaucer's England.

5. Write a few notes (three or four lines in each case) on Gower, Occleve and Lydgate.

6. Give proofs of the influence of Italian Literature on English with regard to matter and form.

7. Give some account of Shakspere's predecessors in the English drama.

8. Write about a page on one of Shakspere's plays Contrast Shakspere and Ben Jonson.

SECOND YEAR.

ENGLISH LITERATURE AND COMPOSITION.

(*For Affiliated Colleges.*)

THURSDAY, APRIL 9TH, 1903:—AFTERNOON, 3 TO 6.

1. Notice Spenser's minor poems. Give a list of English Spenserians who lived in the time of Spenser and subsequently, and name a poetical work (or a poem) of each. Who was the leading Scotch Spenserian? Give some account of his work.

2. Write on the Essay prior to 1660 *or* on the drama between 1750 and 1800.

3. Name the authors and indicate the character of—Hesperides, Arcades, Euphues, Joseph Andrews, The Duchess of Malfi, Areopagitica, The Rape of the Lock, Tom Jones, Apologie for Poetrie, Mirror for Magistrates, Ecclesiastical Polity, New Atlantis, Ormulum, Tale of a Tub, The Excursion, Rasselas, Annus Mirabilis, Satire of the Three Estates.

COMPOSITION.

(*To be written in a separate book.*)

Write an essay of not less than two pages on one of the following subjects:

Patriotism.
Travel.
Sport.

THIRD YEAR.

ENGLISH.

HISTORY OF LITERATURE.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. Write a short account of the nature and purpose of Jeremy Collier's *A Short View;* and express an independent judgment on the controversy.

2. State clearly the leading characteristic features of the Heroic Play, as composed by Dryden.

3. Outline the plot of Addison's *Cato;* and note the chief features of the kind of tragedy to which this play belongs. Wherein lies the dramatic weakness of *Cato?*

4. Write notes on:—*Religio Laici, Eloisa to Abelard,* Pantheism in *An Essay on Man, The Vanity of Human Wishes, The Castle of Indolence, Fingal.*

5. Distinguish the forms of the Heroic Couplet used by Dryden and Pope, respectively.

6. Write a short account of the literary career of Cowper.

7. What are the principal points of interest in the poetry of Crabbe?

THIRD YEAR.

ENGLISH COMPOSITION.

THURSDAY, APRIL 16TH, 1903:—AFTERNOON, 2 TO 5.

(N.B.—*High marks will be given for excellence in arrangement and expression.*)

1. Examine the adequacy of the definition of style as "proper words in proper places."

2. "It is pronounced by Dryden that a line of monosyllables is almost always harsh." (*Johnson.*) Discuss this point.

3. Explain the importance, according to Taine's theory, of the action of the *milieu* in affecting the nature of literary work; *original* illustration preferred. Note carefully the limited applicability of this principle.

4. What distinction is involved in Prof. Saintsbury's recent declaration that the critic should direct his attention chiefly "to questions of form, expression, result, rather than to questions of matter, conception, plan?"

5. Write an essay on any *one* of the following subjects:—

A. Everyman: A morality.

B. A Recent work of Prose Fiction.

C. Dreams.

THIRD AND FOURTH YEARS.

ENGLISH LITERATURE.

ELIZABETHAN DRAMA.

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 5.

1. Discuss the relation of the Miracle and Morality Plays to the Regular Drama.

2. To what extent was the drama developed by (*a*) Lyly, and (*b*) Marlowe?

3. To what periods of Shakspere's career would you ascribe the following plays, and on what grounds:—(*a*) Hamlet; (*b*) A Midsummer Night's Dream; (*b*) The Tempest.

4. State your own view of the characters of Juliet and Hamlet.

5. Write on (*a*) the construction of "Macbeth"; (*b*) the ethics of "King Lear."

6. Show the relation of "Henrv V." to the spirit of the Elizabethan Age.

FOURTH YEAR.

ENGLISH LITERATURE.—(*First Paper.*)

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. Write on Wordsworth's *Prelude* as describing his school-boy days and the growth of his poetical power.

2. Indicate the poetical characteristics of *The Ancient Mariner*. What was Wordsworth's opinion of *The Ancient Mariner?*

3. State (*very briefly*), and illustrate, the leading characteristics of Tennyson's early poems.

4. What preliminary views regarding the lover in *Maud* are necessary to the true conception of the poem? Examine Tennyson's use of Nature in *Maud*.

5. Trace Shelley's main line of thought in *Adonais*. Examine *Thyrsis*.

6. Indicate the general structure of *In Memoriam*. Examine the second division of the poem.

7. Write a short and pointed paragraph, explanatory or otherwise, on each of the following subjects:

(*a*) Coleridge's views of Wordsworth's poetry.
(*b*) The Pantisocracy.
(*c*) Burke's *Reflections*.
(*d*) Wordsworth as Tennyson's forerunner.
(*e*) Southey's epics.

8. Illustrate:

(*a*) Exaltation and depression of character in the course of the Arthur saga;
(*b*) Idealism in some one of the *Idylls*.

9. Write a page on some topic discussed in the lectures and not touched on in the foregoing questions.

FOURTH YEAR.

ENGLISH LITERATURE.—(*Second Paper.*)

WEDNESDAY, APRIL 15TH, 1903:—AFTERNOON, 2 TO 5.

N.B.—*Answer the first three questions and any two in addition. Illustrate as far as possible from the poems read.*

1. Refer each of the following extracts to its context; and discuss in each case how far the lines indicate the special field of the poet quoted.

(*a*) The moving accident is not my trade;
To freeze the blood I have no ready arts:
'Tis my delight alone in summer shade,
To pipe a simple song for thinking hearts.

(*b*) I played a soft and doleful air,
I sang an old and moving story—
An old rude song that suited well
That ruin wild and hoary.

(*c*) Nor would my flesh have shrunk
From seconding my soul, with eyes uplift
And wide to heaven, or, straight like thunder, sunk
To the centre, of an instant; or around
Turned calmly and inquisitive, to scan
The license and the limit, space and bound,
Allowed to truth made visible in man.

(*d*) I wait thy breadth, Great Parent, that my strain
May modulate with murmurs of the air,
And motions of the forest and the sea,
And voice of living beings and woven hymns
Of night and day, and the deep heart of man.
(*e*) Behold I dream a dream of good,
And mingle all the world with thee!

2. Refer to their context, and make short notes upon the following:

(*a*) Pride! bend thine eye from heaven to thine estate,
See how the mighty shrink into a song!
(*b*) There is no other crime, no mad assail
To make old prose in modern rhyme more sweet.
(*c*) You are the men and wisdom shall die with you.
(*d*) To that high Capital, where Kingly Death
Keeps his pale court in beauty and decay.
(*e*) Like that great dame of Lapidoth she sang.

3. Make notes on Coleridge as a revolutionist; Tennyson's treatment of nature in *In Memoriam;* the pictorial power of Scott; the melancholy note in Shelley; Browning's knowledge of the Renaissance.

4. Write on the autobiographical element in Byron's poetry.

5. Discuss Browning's treatment of Theology.

6. Write on Browning as the poet of Art.

7. Write a criticism of *Saul.*

8. *The Princess* has been called "A splendid failure." Justify or refute this criticism.

FOURTH YEAR.

ENGLISH.

HISTORY OF FICTION.

MONDAY, APRIL 6TH, 1903:—AFTERNOON, 2 TO 5.

1. Under the influence of what causes has the Novel risen to its important position in modern literature and life?

2. What distinction is drawn by Hawthorne between the Novel and the Romance? Give examples, and discuss Hawthorne's view independently.

3. State the purpose of *Sir Charles Grandison;* and explain why this novel failed to fulfil it.

4. "The manners of every rank must be seen in order to be known." (*Fielding.*) Is the author of this saying true to his own maxim?

5. What points of resemblance have been noted between *Candide* and *Rasselas?*

6. Write notes on:—*The Castle of Otranto, Caleb Williams, Anastasius, La Princesse de Cvèves.*

7. Discuss the position of Lytton as a writer of historical fiction, and refer to his works in support of your views.

8. Discuss, in detail, the pre-eminence of Jane Austen in her own field of fiction.

FOURTH YEAR.

ENGLISH COMPOSITION.

THURSDAY, APRIL 16TH, 1903:—AFTERNOON, 2 TO 5.

(N.B.—*High marks will be given for excellence in arrangement and expression.*)

1. Give, *in outline*, the theory of Brunetière regarding the evolution of literary genera or species. Discuss and illustrate any *one* of its subdivisions.

2. Distinguish, with the help of specific illustrations, between simplicity and complexity in the substance of a dramatic story.

3. "All casual events are unpleasant in fictitious writing, when they are employed as contrivances to bring about the catastrophe." (*Dugald Stewart.*) Comment on this assertion, and give illustration in support of your own view.

4. Explain carefully the generally accepted meaning of the term *Form*, as applied to Poetry.

5. Explain and illustrate with original examples, the following technical terms:—Culmination of tragedy, Alliteration in modern verse, Rhythm as distinct from formal metre.

6. Write an essay on any *one* of the following subjects:—

A. "The Scipionism of Scipio is precisely that part he could not borrow:" *Emerson.*

B. "No art is easy, least of all the art of letters:" *Raleigh.*

C. "Imaging is, in itself, the very height and life of poetry:" *Dryden.*

THIRD YEAR.

ENGLISH HONOURS.

CHAUCER.

THURSDAY, DEC. 18TH:—AFTERNOON, 2 TO 5.

1. Divide Chaucer's career into periods, and show by reference to his works the influences predominant in each.

2. Give as accurately as you can Chaucer's description of the Parson and the Ploughman. What conclusions may be drawn as to the poet's religious and political opinions?

3. Illustrate from the Prologue to the Canterbury Tales Chaucer's (*a*) humour; (*b*) satirical power; (*c*) felicity of phrase.

4. Outline in your own words the story of the Knighte's Tale *or* the Parlement of Foules, commenting on Chaucer's use of his material.

5. Explain the following passages, and state clearly their context, giving full particulars as to persons, circumstances, etc.:—

(*a*) For *par amour* I loved hir first er thow.
What wiltow seyn? thou wistest nat yet now,
Whether she be a woman or goddesse!
Thyn is affecioun of holinesse,
And myn is love, as to a creature.

(*b*) Now draweth cut, er that we ferrer twinne;
He which that hath the shortest shal biginne.

(*c*) Wel coude he rede a lessoun or a storie,
But alderbest he song an offertorie.

(*d*) Ther saugh I pleyen jogelours,
Magiciens and tregetours,
And phitonesses, charmeresses,
Olde wicches, sorceresses,
That use exorsissaciouns,
And eek thise fumigaciouns.

(*e*) A man may serven bet and more to pay
In half a yere, al-though hit were no more,
Than som man doth that hath served ful yore,

(*f*) 'Lo here! a parfit reson of a goos!'
Quod the sperhauk; 'never mot she thee!
'Lo swich hit is to have a tonge loos!'

THIRD YEAR.

ENGLISH LITERATURE (HONOURS).

SPENSER AND MILTON.

WEDNESDAY, APRIL 22ND, 1903:—AFTERNOON, 2 TO 5.30.

1. In what poems does Spenser refer to (*a*) his wife; (*b*) Lord Burghley; (*c*) Sir Walter Ralegh; (*d*) Sir Philip Sidney?

2. "Among the Renascence poets, Spenser represents the transition from mediævalism." Discuss this statement.

3. In which of Milton's minor poems does he show sympathy with Puritanism? Illustrate with quotations.

4. Narrate the incident of Una and the lion, and explain its allegorical significance.

5. Illustrate from Paradise Lost, Bk. I., Milton's view of heathen mythology. Describe the Council of the Fallen Angels.

6. State precisely where the following passages occur and give as full an account as you can of the context:—

(*a*) By that he ended had his ghostly sermon,
The Foxe was well induc'd to be a Parson.

(*b*) But now my task is smoothly done.
I can fly, or I can run
Quickly to the green earth's end,
Where the bowed welkin slow doth bend.

(*c*) Fame is the spur that the clear spirit doth raise
(That last infirmity of noble mind),
To scorn delights and live laborious days.

(*d*) Phyllis, Charillis, and sweet Amaryllis.
Phyllis, the faire, is eldest of the three;
The next to her is bountiful Charillis:
But the youngest is the highest in degree.

(*e*) The Babe yet lies in smiling infancy
That on the bitter cross
Must redeem our loss,
So both himself and us to glorify.

(*f*) There let the pealing organ blow,

To the full-voiced quire below,
In service high and anthems clear.
(*g*) And let the roring Organs loudly play
The praises of the Lord in lively notes;
The whiles, with hollow throates,
The choristers the joyous Antheme sing.
(*h*) He hates fowle leasings, and vile flatterie,
Two filthie blots in noble gentrie.
(*i*) He told of Senates and Popes and evermore
He strowd an Ave-Mary after and before.
(*j*) What though the field be lost?
All is not lost.
(*k*) Bring the rathe primrose that forsaken dies,
The tufted crow-toe and pale Jessamine.
(*l*) Tell me, ye merchants' daughters, did ye see
So fayre a creature in your towne before?

THIRD YEAR.

ENGLISH (HONOURS.)

PROSE WRITERS BEFORE DRYDEN.—(*First Paper.*)

Books: More, *Utopia;* Bacon, *New Atlantis;* Lodge, *Rosalynd.*

Friday, April 3rd, 1903:—Morning, 9 to 12.

1. Write briefly on literature in England before Chaucer, noting specially those writers who laid the foundations of English prose.

2. Discuss *Utopia* as a piece of literature.

3. Mention the chief social reforms suggested by More in his *Utopia* and show how far these seem justifiable. Compare his social ideal with that of Bacon, as seen in *The New Atlantis.*

4. Discuss the plot, characters and style of Lodge's *Rosalynd.*

5. Name the authors and define the periods of the following extracts. Note the points which distinguish the two styles, and state clearly what influences produced the change.

(*a*) And by sodeyne aduenture ther was an horryble lyon kepte in a stronge Toure of stone and it happend that he at the tyme brake loos, and come hur-

lynge afore the Quene & her Knyghtes. And whanne the Quene sawe the lyon, she cryed and fledde, and praide her Knyghtes to rescowe her, and there was none of hem alle but twelve that abode, and alle the other fledde, Thenne saide La cote male taile; Now I see wel that alle coward knyghtes ben not dede, and there with alle he drewe his swerd, and dressed hym afore the lyon, and that lyon gaped wyde and came upon hym raumppynge to have slayne hym, and he thenne smote hym in the mydde of the hede suche a myghty stroke, that it clofe his hede in sonder, and dasshed to the erthe. Thenne was it tolde the Quene how the yonge man named by scorne La Cote male tayle hadde slayne the lyon. With that the Kyng came home, and whanne the Quene told hym of that aduenture, he was wel pleased and saide, upon payne of myn hede he shalle preue a noble man and a feythful Knyghte and true of his promyse thanne the Kyng forth with al madde hym Knyghte.

(*b*) I am, sir (whatsoever thou art) a forrester and a ranger of these walkes, who, following my deere to the fall, was conducted hither by some assenting fate, that I might save thee, and disparage myselfe. For comming into this place, I saw thee asleepe, and the lyon watching thy awake, that at thy rising he might pray uppon thy carkasse. At the first sight I conjectured thee a gentleman (for all men's thoughts ought to bee favourable in imagination) and I counted it the part of a resolute man to purchase a stranger's reliefe, though with the losse of his owne blood, which I have performed (thou seest) to mine owne prejudice. If therefore, thou be a man of such worth as I value thee by thy exteriour liniaments, make discourse unto me what is the cause of thy present misfortunes; for by the furrowes in thy face thou seemest to be crost with her frownes; but whatsoever, or howsoever, lett mee crave that favour, to heare the tragick cause of thy estate.

THIRD YEAR.

ENGLISH (HONOURS.)

PROSE WRITERS BEFORE DRYDEN.—(*Second Paper.*)

Books: SIDNEY, *An Apologie for Poetrie;* EARLE, *Microcosmographie;* MILTON, *Areopagitica.*

FRIDAY, APRIL 3RD, 1903:—AFTERNOON, 2 TO 5.

1. Compare, in their general outlines, *An Apologie for Poetrie* and *An Essay of Dramatic Poesy;* and account for the differences which you find.

2. Make notes on the following: Sidney's debt to Aristotle; to Scaliger; effect of ballad poetry; *in despite of Pallas; blind crowder.*

3. What special contribution was made by each of the following to the development of English prose: Roger Ascham, Thomas Cranmer, John Earle, Sir William Temple, John Bunyan?

4. Give some account of Milton's work in prose, and discuss his style. Illustrate by quotation or direct reference.

5. Write on Seventeenth Century Ideals, *or* The Literary Position of Dryden.

THIRD YEAR.

ENGLISH (HONOURS).

ANGLO-SAXON—(*Grammar and Philology*).

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 10.15.

1. Name the non-W.S. dialects and give characteristic marks of each.

2. Take the Indo-Germanic ablaut-series e; o; —; and transfer it to Primitive Teutonic, Mœso-Gothic and Anglo-Saxon (explain all varieties). Similarly transfer the two Indo-Germanic diphthongal series.

3. Define umlaut and illustrate fully its various forms.

4. Decline, hus, sunu, thu (all numbers), god (all numbers).

Conjugate a weak verb of the second conjugation and decline its past participle.

THIRD YEAR.

ENGLISH (HONOURS).

ANGLO-SAXON (TEXTS).—(*First Paper.*)

MONDAY, APRIL 20TH, 1903:—MORNING, 10.15 TO 12.

Translate:—

(*a*) Ond ic bebiode on Godes naman thæt nan monn thone æstel from thære bec ne do, ne tha boc from thæm mynstre; uncuth hu longe thær swæ gelærede biscepas sien, swæ swæ nu, Gode thonc, wel hwær siendon. For thy ic wolde thætte hie ealneg æt thære stowe wæren, buton se biscep hie mid him habban wille, oththe hio hwær to læne sie, oththe hwa othre bi write.

(*b*) Tha wæron hie to thæm gesargode thæt hie ne mehton Suthseaxna lond utan berowan, ac hira thær tu sæ on lond wearp; ond tha monn mon lædde to Winteceastre to thæm cynge, ond he hie thær ahon het; ond tha monn comon on Eastengle the on thæm

(*c*) Ic Ine mid Godes gife Wesseaxna kyning, mid getheahte ond mid lare Cenredes mines fæder, ond Heddes mines biscepes, ond Eorcenwoldes mines biscepes, mid eallum minum ealdormonnum, ond thæm ieldstan witum minre theode, ond eac micelre gesomnunge Godes theowa, wæs smeagende be thære hælo urra sawla, ond be tham stathole ures rices, thættē ryht æw ond ryhte cynedomas thurh ure folc gefæstnode ond getrymede wæron, thætte nænig ealdormonna ne us undergetheodedra æfter tham wære awendende thas ure domas.

(*d*) Andlang dic to tham wege the scytt up to tham hricgge. Andlang hricgges to tham wege the scytt fram Fealuwes-lea to Baddan-by ane lytle hwile. Thonne of thære apuldre the stent with westan tham wege thurh thone lea to tham miclan hæslwride. Of tham hæslwride adun on tha blacan rixa. Of tham rixun on tha lytlan hecggan æt tham wege the scytt fram Baddan-by to cearwyllun.

(*e*) Stod under linde, under leohtum scylde,
thær tha mihtigan wif hyra mægen berædden
and hy gyllende garas sændan;
ic him otherne eft wille sændan
fleogende flan forane togeanes.

(*f*) Thæt gesyne wearth,

*w*idcuth *w*erum, thætte *w*recend tha gyt
lifde æfter *l*athum, *l*ange thrage,
æfter *g*uthceare: *G*rendles modor,
*i*des *a*glæcwif *y*rmthe gemunde,
se the *w*æteregesan *w*unian scolde,
*c*ealde streamas.

(*g*) Ne nom he in thæm *w*icum, *W*edergeata leod,
*m*athmæhta *m*a, theh he thær *m*onige geseah,
buton thone *h*afelan and tha *h*ilt somod,
*s*ince fage; *s*weord ær gemealt,
forbarn *b*roden mæl: wæs thæt *b*lod to thæs hat,
*ac*ttren *c*llorgæst, se thær-*i*nne swealt.

(*h*) To *h*eanlic me thinceth
thæt ge mid urum *sc*eattum to *sc*ype gangon
unbe*f*ohtene, nu ge thus *f*eor*r* hider
on *u*rne *c*ard *inn* becomon;
ne sceole ge swa *s*ofte *s*inc gegangan:
us sceal *o*rd and *e*cg r geseman,
*g*rimm *g*uthplega, ær we *g*afol syllon,
anum scipe wæron swithe forwundode.

(*i*) Me hafath *h*ringa gespong,
*s*lithhearda *s*al *s*ithes amyrred,
a*f*yrred me min *f*ethe, *f*et synt gebundene,
*h*anda ge*h*æfte; synt thissa *h*eldora
*w*egas for*w*orhte; swa ic mid *w*ihte ne mæg
of thissum *l*iothobendum.

(*j*) Mec se *u*eta uong, *u*undrum freorig,
ob his *i*nnathæ *ae*rest cænd[æ].
Ni uuat ic mec bi*u*orhtæ *u*ullan fliusum,
*h*erum therh *h*ehcræft *h*[y]gido[n]cum [minum].
*U*undnæ me ni biath *u*eflæ, ni ic *u*arp hefæ,
ni therih *th*rea[t]un githræc *th*red me hlimmith,
ne me *h*rutendum *h*risil scelfæth,
ni mec *o*u[ua]n[a] *aa*m sceal cnyssa.
*U*yrmas mec ni a*u*efun *u*yndicræftum,
tha thi *g*eolu *g*oduebb *g*eatum frætuath.
Uil mec hudræ suæ theh uidæ ofær eorthu
*h*atan mith *h*elithum *h*yhtlic giuæde.
Ni anœgnu ic me *ae*rigfæræ *eg*san brogum,
theh thi ni[mæn *f*lanas *f*rac]adlicæ ob cocrum.

Scan (*f*).

THIRD YEAR.

ENGLISH (HONOURS).

ANGLO-SAXON TEXTS—(*Unseen*) AND LITERATURE.

MONDAY, APRIL 20TH, 1903:—AFTERNOON, 2 TO 5.

I. Translate:

(*a*) Tha ongunnan twa theoda Pyhtas northan ond Scottas westan hi onwinnan ond heora æhta niman ond hergian; ond hi fela geara yrmdon ond hyndon. Tha on thære unstilnysse onsendon hi ærendwrecan to Rome mid gewritum ond wependre bene; him fultumes bædon, ond him gehetan eathmode hyrnysse ond singale under-theodnysse, gif hi him gefultumadon thæt hi mihton heora fynd oferwinnan. Tha onsendan hi him mycelne here to fultume. Ond sona thæs the hi on this ealond comon, tha compedon hi with heora feondum, ond him mycel wæl ongeslogan, ond of heora gemærum adrifon ond aflymdon. Ond lærdon thæt hi fæsten worhtan him to gebeorge with heora feondum: ond swa mid mycele sige ham foran.

O. E. TRANS. OF BEDE.

(*b*) Æfter thison gelamp thæt thæs cyninges mæg, Nicanor, wearth gescoten mid anre fla on tham cneowe æt sumon gefeohte, swa thæt nan man hi ne mihte of tham bane ateon; ac se eadiga apostol Simon, on Cristes naman, hi ut-adyde, swa hrathe swa he hi hrepode; and seo wund wearth thærrihte gehæled, swa thæt thær nan dol-swathu næs gesyne. Eac siththan gelamp thæt twa hrethe deor, the sind tigres gehatene, thær urnon, and abiton swa hwæt swa hi gemetton. Tha fleah thæt folc eal to tham apostolum, and hi, thurh Godes mihte, tha deor swa getemedon, thæt hi him fyligdon to heora inne, and mid him unscæththige wunedon. Tha cwædon tha apostoli to tham folce, "Thas rethan deor gehyrsumiath Godes mihte, and sind eow to gewitnysse thæt he is Ælmihtig God, sethe eow gesceop, and sylth eow renas of heofenum, and hlaf of eorthan, win and ele of treowum, and eac othre wæstmas. Nu mynegiath thas deor eow, mid sumon gemete, thæt ge nænne otherne ne wurthion eow to Gode, buton thone the we bodiath, thurh thæs naman sind thas rethan tigres betwux eow swa tame swa scep.

We scelon nu faran to othrum scirum, godspel bodigende, and thone sothan geleafan.

ÆLFRIC.

(*c*) Him se yldesta ondswarode,
werodes wisa word-hord onleac:
"We synt gum-cynnes Geata leode
ond Higelaces heorth-geneatas.
Wæs min fæder folcum gecythed,
æthele ord-fruma Ecgtheow haten;
gebad wintra worn, ær he on weg hwurfe
gamol of geardum; him gearwe geman,
witena wel-hwylc wide geond eorthan.
We thurh holdne hige hlaford thinne,
sunu Healfdenes, sccean cwomon,
leod-gebyrgean; wes thu us larena god.

BEOWULF.

II. Translate:

Mec feonda sum feore besnythede,
woruldstrenga binom, wætte siththan,
dyfde on wætre, dyde eft thonan,
sette on sunnan, thær ic swithe beleas
herum, tham the ic hæfde. Heard mec siththan
snath seaxes ecg sindrum begrunden,
fingras feoldan ond mec fugles wyn
geondsprengde speddropum, spyrede genneahe
ofer brunne brerd, beamtelge swealg,
streames dæle, stop eft on mec,
sithade sweartlast. Mec siththan wrah
hæleth hleobordum, hyde bethenede,
gierede mec with golde: forthon me gliwedon
wrætlic weorc smitha wire bifongen.

III. (1) Write on (*a*) Runes; (*b*) Runic inscriptions, with especial reference to the Ruthwell cross and the Franks' casket.

(2) Describe an Anglo-Saxon charter.

(3) Write on Cynewulf.

(4) Give the principal parts of all the strong verbs in II.

THIRD YEAR.

ENGLISH (HONOURS).

MIDDLE ENGLISH.

TUESDAY, APRIL 21ST, 1903:—MORNING, 9 TO 11.

1. What is meant by the term Middle English? Give

some account of the locality and history of the chief Middle English dialects.

2. Translate:

(*a*) The king Willam, uorto wite the wurth of is londe,
Let enqueri streitliche thoru al Engelonde,
Hou moni plou lond & hou moni hiden al-so,
Were in eu*e*rich ssir*e* & wat hii were wurth th*er*-to;
& the rentes of ech tou*n* & of the wat*e*res echone
Thet worth, & of wodes ek that th*er* ne bileuede none,
That he nuste wat hii were worth of al Engelonde,
& wite al clene th*at* worth th*er*-of, ich vnd*er*-stonde,
& let it write clene ynou & th*at* scrit dude iwis
In the tresorie at Westm*instre* there [as] it yut is.

(*b*) Of Lau*er*d es land and fulhed his;
Ertheli werld, and alle thar-in is.
For ouer sees it grounded he,
And ouer stremes graithed it to be.
Wha sal stegh in hill*e* of Lau*er*d winli,
Or wha sal stand in his stede hali?
Vnderand of hend bidene,
And that of his hert es clene;
In vnnait that his saule noght nam,
Ne swar*e* to his neghburgh in swikedam.

(*c*) And wanne hi crisneth ine the fougt,
The prestes so thries duppeth,
In the honur of the Trinité,
Ac gode yeme kepeth
The ned;
On time a clothe that water ikest,
Ac ope the heuede te bede.

(*d*) Ich y-zeg the apostles ine tronen zittynde. the tribz / and the tongen / alle preste. and of poure / and of zyke; zuo blisuolle and holy / of oure lhord iesu crist / and zuo hege / vnog alneway ich am wondrinde. Ich y-zegac / uollyche ich ne my[g]te al yzy / the innumerable uelagrede of the holy martires / mid blisse and worthssipe / y-corouned. thet be the pinen of thise time / huyche hi beren to tho blisse / thet wes ysseawed ine ham: hy come therto. Hyre holynesse / and hyre blysse: long time ich me lykede. Ich yzeg to the blyssede heape of *con*fessors. amang huam / men apostles / and techeres / thet holy cherche mid hare techinge wereden. and alsuo uram alle heresye / wy[th]-oute wem habbeth yclenzed:

sseaweth. and hy uele habbeth y-tagt. ssyneth ase sterren / ine eurelestynde wy[th]-oute ende. Ther byeth Monekes thet uor claustres / and uor strayte cellen. wel moche / an clyerer thanne the zonne: habbeth wonyinges. Vor blake and uor harde kertles / huyter thane the snaw. and of alle zofthede / and nesshede / clothinge habbeth an. Vram here egen / god wypeth alle tyeres. and thane kyng hy ssolle ysy ine hys uayrhede. Alast / to the uelagrede of maydynes ich lokede. of huychen blysse ssepthe / agraythinge / and melodya. huyche none mannes speche: dingnelyche may telle. And hy zonge thane zang: thet non other ne may zynge.

ENGLISH (HONOURS).

HISTORY OF LITERATURE.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

1. Discuss the principal causes which, during the seventeenth century, prevented English Literature from influencing its nearest continental neighbors.

2. State clearly the points emphasized by Saint-Evremond in contrasting the tragedies of England with those of France.

3. Explain carefully the position of Voltaire in regard to the fundamental conception of tragic treatment in the drama. Criticise his view independently.

4. In what respects may it be said that English life and literature influenced the work of Prévost?

5. Give some account of the effect produced by the Ossianic poems on Chateaubriand, Lamartine, and Musset.

6. Establish the literary relations between the play of *Hamlet* and either *Lorenzaccio*, or *Andr Cornéglis*.

7. Indicate the character in the work of Scott that appealed to the Romantic imagination in France about the year 1830.

8. Give a short account of *Obermann*.

9. What literary relations have been traced between Young and Novalis?

FOURTH YEAR.

ENGLISH HONOURS.

HISTORY OF SHAKSPEREAN CRITICISM.

TIME: THREE HOURS.

FRIDAY, DEC. 19TH:—MORNING, 9 TO 12.

1. Discuss the "Unities" ascribed to Aristotle, and show how they affected French and English dramatic criticism in the seventeenth and eighteenth centuries.

2. In what esteem was Shakspere held by his contemporaries? Discuss Ben Jonson's attitude towards him.

3. State clearly Lessing's contributions to Shaksperean criticism, and their effect upon European thought.

4. Compare German and English criticism of Shakspere at the beginning of the nineteenth century.

5. Illustrate by the detailed discussion of an issue of your own choosing the methods of recent Shaksperean criticism.

FOURTH YEAR.

ENGLISH LITERATURE (HONOURS).

BROWNING.

WEDNESDAY APRIL 22ND, 1903:—AFTERNOON, 2 TO 5.

1. Outline the story of "The Ring and the Book;" explain the significance of the title; comment upon Browning's use of his material.

2. "Browning unites Classicism and Romanticism." Give reasons for modifying, supporting, or denying this statement.

3. Where did Browning spend most of his life, and what influence had his place of residence on his poetic development?

4. State precisely where the following passages occur and give as full an account as you can of the context,

outlining the whole poem if it is necesary in order to bring out the significance of the quotation. Illustrate the ideas set forth by parallel passages in other Browning poems:—

(*a*) There was place and to spare for the frank
And the red young mouth, and the hair's young gold.

(*b*) Now I may speak: you fool, for all
Your lore! *Who* made things plain in vain?

(*c*) On the earth the broken arcs; in the heaven, a perfect round.

(*d*) Ah, but a man's reach should exceed his grasp.

(*e*) Friends—lovers that might have been.

(*f* Rather I prize the doubt
Finished and finite clods, untroubled by a spark.

(*g*) Oh, a crime will do
As well, I reply, to serve for a test,
As a virtue golden through and through.

(*h*) "Therefore she is immortally my bride;
Chance cannot change my love, nor time impair."

(*i*) And you, great sculptor—so, you gave
A score of years to art, her slave,
And that's your Venus, whence we turn
To yonder girl that fords the burn!

(*j*) The love which to one and one only has reference
Seems terribly like what perhaps gains God's preference.

FOURTH YEAR.

ENGLISH LITERATURE (HONOURS).

MODERN PROSE.—(*First Paper.*)

FRIDAY, APRIL 3RD, 1903:—AFTERNOON, 2 TO 5.

1. Estimate the influence of French models on English prose after the Restoration.

2. Point out the leading characteristics of the prose styles of (*a*) Defoe, (*b*) Swift, and (*c*) Burke. Give a short account of the literary activity of each.

3. Discuss the relations between journalism and

literature in the first half of the nineteenth century.

4. Who is in your opinion the greatest master of prose of the nineteenth century? Give reasons for your preference.

FOURTH YEAR.

ENGLISH LITERATURE (HONOURS).

MODERN PROSE.—(*Second Paper.*)

TUESDAY, APRIL 7TH, 1903:—AFTERNOON, 2 TO 5.

1. Discuss the character, extent and permanence of Carlyle's influence. Summarize his lecture on "The Hero as Man of Letters."

2. Illustrate from "The Crown of Wild Olive" Ruskin's peculiarities of thought and style.

3. What do you regard as Matthew Arnold's pre-eminent excellences as a critic? Illustrate from the essays you have read.

4. In what way do the essays included in "Virginibus Puerisque" reflect Stevenson's personality? How far do you think the effect he obtains is due to deftness of literary craftsmanship?

HISTORY

THIRD AND FOURTH YEARS.

HISTORY.—(*First Paper.*)

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

1. Write a short essay on any one of the political or ecclesiastical institutions which were established in Europe during the whole, or any portion, of the period, 400-1050.

2. Describe the relations of the Germans with Rome prior to 378.

3. Why is the 4th century an age of particular importance?

4. Trace the historical development of the Gothic race in all its branches.

5. Illustrate as fully as possible the greatness of the House of Landen prior to the accession of Charlemagne.

6. Indicate on the map the location of the following places and districts: Dalmatia; the field of battle between Aetius and Attila; Verona; Pisa; Poitiers; Strassburg; Lorraine; Laon; the stem duchies; Rouen.

7. Make brief notes on the following subjects: The worship of Mithra; Decius and the Church; St. Jerome; the descendants of Theodosius in the eastern branch; the greatest of the Lombard queens; the battle of Testry; the Ommiad dynasty; the Capitulary of Kiersy; the ancestors of Hugh Capet; the political ideal of Otto III.

THIRD AND FOURTH YEARS.

HISTORY.—(*Second Paper.*)

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

1. Indicate and comment upon the chief features of French history during the 12th century.

2. Examine the feud of Guelf and Ghibelline in all its bearings.

3. Show at length why the 13th century is a great era in the history of the Latin Church.

4. Discuss the intellectual and artistic eminence of Italy during the 15th century, *or*, describe the political condition of the peninsula during the same period.

5. Why was Luther led into conflict with other antagonists of Rome, and who were his chief opponents among them, 1517-1530?

6. Indicate on the map the location of the following places and districts: the kingdom of Leon; Compostella; Cordova; Toulouse; Avignon; Orleans; Clermont; Bologna; the original possessions of Rudolf of Hapsburg; Savoy.

7. Make brief notes upon the following subjects: the intellectual position of Abelard; the criminal jurisprudence of Louis IX.; the character of Frederick II.; the bull, *Ausculta Fili;* the battle of Crecy, considered from the military standpoint; Gregory XI.; Charles VIII. at Milan, 1494; the League of Cambrai, 1508; the *Christian Prince;* Luther and Miltitz.

THIRD AND FOURTH YEARS.

ENGLISH CONSTITUTIONAL HISTORY.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. Illustrate the fact that the institutions of England during the period of the Heptarchy possessed a Germanic character,—having in mind the primitive institutions of the Germans, and also the customs of German tribes on the continent during the period 400-800.

2. Sketch the history of Christianity in Britain from its origin to the Council of Whitby.

3. Describe the composition and functions of:
   (*a*) The Witan;
   (*b*) The *Curia Regis.*

4. Investigate the relations of crown and nobles during the reigns of:
   (*a*) William I.;
   (*b*) Henry I.;
   (*c*) Henry II.

In answering this question be careful to mark fluctuations in the power of the baronage.

5. What was the constitutional status of the towns during the early Angevin period?

6. Discuss the antecedents of Simon de Montfort's Parliament, with special reference to the years 1250-1265.

7. (*a*) What were the chief fiscal measures of Edward I.?

(*b*) Make brief notes on: The ransom of Richard I; the Carucage of 1198; sections 12-15 of Magna Carta; distraint of knighthood; the Parliament of 1275.

THIRD YEAR.

HISTORY (HONOURS).

GREEK AUTHORS.

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 12.

(*Answer seven questions.*)

1. Compare the historical spirit and method of Herodotus with that of Modern History generally, or of any individual modern historian.

2. Give a condensed account of the chief events in the Second Persian War (479 B.C.), basing your version on those of Herodotus and Plutarch.

3. What part do the following individuals play in history, according to your authorities?

Miltiades, Leonidas, Pausanias, Lamachus, Hermocrates.

4. Describe the causes, real and apparent, which led *either* to the Peloponnesian War, *or* to the Sicilian expedition, noting the influence of powerful individuals.

5. How are the following topics treated in the speeches of Thucydides (Books I., II., 1-65, VI. and VII.).

(1) Relation between Mother Country and Colonies.

(2) Empire and the position of an Imperial City.

(3) Democracy.

(4) Contrast between Athens and Sparta.

6. Illustrate Plutarch's view of the purpose and use of biography, from his lives of Timoleon, and of Aristides.

7. Mention the chief definitions of justice given in

Plato's Republic. Show that justice is the basis of the Ideal State.

8. How does Plato characterize democracy, oligarchy and tyranny in his account of the decline of states (Republic VIII. and IX.)?

9. What views may be found in the Republic on the following subjects:—War, Private Property, Slavery, Education?

THIRD YEAR.

HISTORY (HONOURS).

POLYBIUS: I., II., V.; LIVY: XXI., XXII.; TACITUS: *Annals* II., *Agricola, Germania.*

MONDAY, APRIL 6TH, 1903:—MORNING 9 TO 12.

Answer any three of the first four questions, any two of questions 5-7, and question 8.

1. Comment on:
   (*a*) The two Achaean Leagues;
   (*b*) The main episodes of the Cleomenic War;
   (*c*) The attitude of Polybius towards Phylarchus.
2. Give some account of:
   (*a*) The career of Regulus.
   (*b*) The career of Hamilcar Barca.
3. Polybius indicates certain motives which dominate his first and second Books. Name these, and express any opinion which you may have formed regarding his arrangement of material.
4. (*a*) Describe Philip's invasion of Aetolia.
   (*b*) Discuss the plundering of Thermus, and state the nature of the reflections which it calls forth from Polybius.
5. Give a list of the speeches which occur in the twenty-first and twenty-second Books of Livy, and write a general criticism of them.
6. Sketch that portion of the Second Punic War which falls within the Dictatorship of Fabius Maximus.
7. Make notes on: Hannibal's dream; The Battle of the Trebia; Carthaginian tactics at Lake Trasumennus; The advice of Maharbal after Cannae; The protest of Manlius Torquatus.

8. (*a*) What do you know concerning Arminius?

(*b*) What information regarding Britain and its inhabitants have you gathered from the *Agricola?*

(*c*) Single out the chief tribes mentioned in the *Germania*, indicating their geographical location and specifying their leading characteristics.

THIRD AND FOURTH YEARS.

HISTORY (HONOURS).

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

1. Name the literary opponents of the Papacy during the first half of the 14th century, indicating the nature of their opinions and establishing their connection with contemporary politics.

2. Sketch the constitutional history of Venice from the changes of Piero Gradenigo to the death of Marino Faliero.

3. (*a*) Examine the career of Gian Galeazzo Visconti;

(*b*) Give some account of Italian warfare, 1350-1450, with names of the leading *condottieri*.

4. What were the chief economic conditions which affected the Renaissance?

5. Indicate the main characteristics of Italian art from Giotto to Brunelleschi.

6. Name the most important problems which were presented to the Council of Constance, and discuss any two of them.

7. Write briefly on any two of the following subjects:

(*a*) Albornoz in the Romagna;

(*b*) Latin scholarship in the early Renaissance:

(*c*) The rule of Cosimo de'Medici at Florence, 1434-1447;

(*d*) Benedict XIII and the movement for reform;

(*e*) The *agenda* of the Council of Basel;

or

Give a detailed list of Italian despots, 1300-1470, with indication in each case of the territories which they controlled.

FOURTH YEAR.

HISTORY (HONOURS).

THE POLITICAL HISTORY OF THE AMERICAN COLONIES.

1. Outline the history of the relations of Church and State in the American colonies.

2. Tabulate the chief events in the struggle between France and England for supremacy in North America.

3. State the case for England in her controversy with the American colonies.

4. Shew the bearing of the history of the United States under the confederation on the formation of the Constitution of 1787.

FOURTH YEAR.

HISTORY (HONOURS).

THE POLITICAL HISTORY OF THE UNITED STATES.

1. Outline the course of federal and state legislation in reference to slavery and its interpretation by the courts, from the adoption of the constitution of the United States till the passage of the thirteenth amendment (1865).

2. Discuss the effect of economic factors on the development of political institutions and national characteristics in the United States in the nineteenth century.

3. State briefly the leading facts in connection with the following:—Hamilton's Finance Measures, Jefferson's Embargo, The Hartford Convention, Nullification, The Annexation of Texas, The Trent Affair.

4. Explain in a few words the allusions of the following historical catchwords: The 'X. Y. Z.' Despatches, the 'Blue Light' Federalists, the 'Kitchen' Cabinet, the 'Come-Outers,' 'Know-Nothingism,' 'Fifty-four-forty or Fight,' 'King Cotton.'

FOURTH YEAR.

HISTORY (HONOURS).

BAGEHOT: *The English Constitution;* BRYCE: *The American Commonwealth,* Vol. I.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

Answer the first three questions and any five of the remainder.

1. Enumerate the main functions of the English monarchy, following Bagehot's conception of them.
2. At what points does Bagehot bring the political ideas of England and the United States into comparison?
3. Indicate the nature of those political arrangements which are bound up with a change of ministry.
4. Examine the nature of federal government in the United States.
5. Describe the functions of the Senate *or* the House of Representatives.
6. What are the relations of Congress to the President?
7. What are the working relations of the national and state governments?
8. How has the constitution of the United States developed by usage?
9. Discuss the nature of the American state.
10. What is the status of the territories?
11. Give some account of city government in the United States.

FOURTH YEAR.

HISTORY (HONOURS).

MATTHEW ARNOLD: *Pagan and Mediaeval Religious Sentiment;* PARKMAN: *Montcalm and Wolfe;* MAHAN: *The Influence of Sea Power on History.*

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

Answer the first four questions and any three of the others.

1. Contrast the fifteenth idyll of Theocritus with the *Canticle of the Sun.*

2. Sketch the relations of English and French in America during 1755 and 1756.

3. Describe the siege of Louisbourg, 1758, *or* the Ticonderoga campaign of the same year.

4. Make notes on: Céleron de Bienville; the capture of Oswego; Montcalm and Vaudreuil; the battle of Ste. Foye.

5. Write an estimate of the naval importance which was possessed by Holland in the second half of the 17th century, having especially in mind the career of De Ruyter.

6. What naval engagements or operations took place in the Mediterranean during the 18th century?

7. How has sea power affected the position of England in India?

8. What part did sea power play in the War of the American Revolution prior to 1781?

FOURTH YEAR.

HISTORY (HONOURS).

GIBBON: *Decline and Fall*, Caps. XLIV., L., LI., LXVI.; STUBBS: *Select Charters, Introduction;* LANGLOIS and SEIGNOBOS: *Introduction to the Study of History.*

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

1. Follow the development of Roman jurisprudence from the Decemvirs to Justinian.

2. Trace the career of Mahomet during the last ten years of his life.

3. Describe the conquest of Syria by the Mohammedans.

4. What points does Gibbon chiefly accentuate in his account of the Revival of Learning?

5. (*a*) Describe the judicial system as it was under Henry II.

(*b*) "The idea of constitutional government, defined by the measures of Edward I., and summed up

in the legal meaning of the word *parliament*, implies four principles."

What are these?

6. Indicate, with comment, the sciences which are auxiliary to History.

7. What are the main processes of external criticism?

8. What views does M. Seignobos express regarding the object of historical exposition?

FOURTH YEAR.

HISTORY (HONOURS).

CLARENDON: *History of the Great Rebellion*, Book XI.;

BURKE: *Reflections on the French Revolution;*

MACAULAY: *History of England*, Cap. III.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. What part does Cromwell play in the eleventh book of Clarendon?

2. Outline the negotiations between Charles I. and the Commissioners for the treaty in 1648.

3. Explain Burke's attitude towards the English Revolution of 1688.

4. Illustrate Burke's feelings towards the Old Règime in France.

5. Follow Burke's criticism of:

(*a*) the departmental system;

(*b*) the King's position under the National Assembly;

(*c*) the financial expedients of the National Assembly.

6. Write an account of London as it was in the reign of Charles II.

7. What was the condition at the same period:

(*a*) of the navy;

(*b*) of the common people.

ECONOMICS AND POLITICAL SCIENCE

THIRD AND FOURTH YEARS.

POLITICAL ECONOMY.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

Six questions to be answered.

1. Explain what is known as the "Wages Fund" doctrine and compare it with modern views as to how the level of wages is related to the supply of capital.

2. What meaning do you assign to the phrase "productivity of capital?" Show from what causes this productivity takes its rise.

3. For what economic function do "profits" afford the remuneration? Trace the general nature of the evolution of the relation of capitalists to industrial enterprise.

4. Carefully distinguish between the qualities which are required of money as a medium of exchange and a value-denominator respectively. Illustrate and comment on the separation of these functions in modern trade.

5. Discuss the following:

"Credit is not a productive power in itself, but, without it, the productive powers already existing could not be brought into complete employment," and explain the functions of credit in relation to production.

6. Two countries, A and B, are isolated from the rest of the world. A trade has been established between them, A exporting corn and importing timber and hides. Coal being discovered in B, large quantities are exported from B to A. How, if at all, will this discovery affect the prices of corn, timber and hides in the two countries respectively?

7. "Exports and imports pay for each other." How then do you account for the fact that, both in the fore-

ign trade of individual countries, and in the international trade of the whole world, imports are found to considerably exceed exports?

8. Explain what is meant when it is said that the foreign exchanges are unfavourable to a country; and show in what way an unfavourable exchange encourages the exportation of commodities and discourages their importation.

9. Trace the economic effects of a bountiful harvest in an advanced country.

THIRD AND FOURTH YEARS.

POLITICAL SCIENCE.

MONDAY, APRIL 6TH, 1903:—AFTERNOON, 2 TO 5.

Omit one of the first four questions.

1. Give a short account of Austin's theory of Sovereignty. What does Sir Henry Maine mean by saying that it is the "result of abstraction"?

2. Explain and contrast the relation of the courts of law to the other branches of the Government in England and in the United States.

3. State accurately the composition of the following political bodies: the French Senate, the Hungarian Diet, the Swiss Federal Council.

4. Describe the constitutional position of (i) the German Emperor, (ii) the Supreme Court of the United States.

5. Explain clearly the political status of Cuba.

6. Discuss the relative constitutional powers of the two British Houses of Parliament.

7. Write a paper (not more than nine hundred words) on:—

The Relation of Government to Trade and Industry.

FOURTH YEAR.

POLITICAL SCIENCE (HONOURS.)

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. State and criticize Herbert Spencer's views in reference to the economic functions of Government.

2. Shew the practical difficulties that would attend any attempt to "nationalize the means of production."

3. Discuss the chief points in the political philosophy of Humboldt, Karl Marx, Bastiat.

4. What legislative policy would you recommend in reference to the Trusts in the United States?

5. Shew the very extensive interpretation that may be given to the idea of Government as a "producer of security."

6. Write short papers on each of the following topics:—

(*a*) English legislative policy in reference to trade and industry during the Peace Era (1815-1850).

(*b*) State Socialism in Germany.

ECONOMIC HISTORY OF ENGLAND.

MONDAY, APRIL 20TH: MORNING, 9 to 12.

1. Describe "the colonial system" (on its economic side) as practiced in England, and estimate the economic results to England of the possession of colonies so long as the system lasted.

2. Contrast the economic aims and the methods of trades unions with those of craft gilds.

3. "An agrarian revolution plays as large part in the industrial change of the eighteenth century as does the revolution in manufacturing industries to which attention is more usually directed."—(Toynbee).

What were the leading features of the agrarian revolution referred to?

4. What points in the English poor law, before its reform in 1834, specially affected for ill the situation of the working classes? On what principles was the Act of 1834 mainly founded?

5. In what principal directions was reform effected in English taxation during George III.'s reign? What great hindrance to equitable readjustment of tax burdens existed during the first part of that period?

6. Contrast the methods of public borrowing employed in England a couple of centuries ago, with those generally followed nowadays. State especially the relation of the South Sea Company to the public debt.

ECONOMIC HISTORY OF ENGLAND.

MONDAY, APRIL 20TH: AFTERNOON, 2 TO 5.

1. By what steps were the textile industries transformed during the period covered by "the Industrial Revolution"?

2. Show the intimate connection between the improvement of transportation and the development of industry. Sketch the course of improvement in England for the century following 1750.

3. Trace the changes in the legal status of workmen's combinations in England in the 18th and 19th centuries.

4. What evils were principally aimed at in the early factory legislation? Trace the general course of legislation on this subject in England, and compare with the situation in Canada.

5. Write notes on the following:—

(*a*) The Eden Treaty.
(*b*) The Sinking Fund.
(*c*) The Speenham Land Act.
(*d*) The Dorsetshire Laborers.
(*e*) The Chartist Movement.
(*f*) The Penny Post.

ART HISTORY AND ARCHAEOLOGY

THIRD AND FOURTH YEARS.

ART HISTORY AND CLASSICAL ARCHAEOLOGY.

WEDNESDAY, APRIL 22ND, 1903: AFTERNOON, 2 TO 5.

(N.B.—*Five questions only required*).

1. Give some account of Myron's works, with a critical estimate of his place in the development of Greek sculpture.

2. Discuss the "Scribe" of the Louvre Museum and the statute of Khafra (Cizeh Museum) as masterpieces of early Egyptian sculpture, comparing them respectively with primitive Greek work, and with the ideal sculpture of the fifth century, B.C., in Greece.

3. Give an account of the Pergamene school of sculpture, and of the principal works now extant which are attributed to it; adding a note as to subsequent works in sculpture that may be held to carry on the Pergamene tradition.

4. Enumerate the chief characteristic features of Greek Doric architecture, illustrating (if possible) by sketches (pencil or ink, left rough, but clear). Discuss the origin of the characteristic forms, and estimate critically the artistic qualities of the style and its aesthetic significance, as perfected in the age of Pericles.

5. Describe the Acropolis at Athens, giving a brief architectural account and historical notice of the classical buildings upon it, and mentioning some of

the more famous of the works of sculpture which, in ancient times were dedicated there.

Or (alternatively),

Give a similar description and account of the Palatine Hill, Rome, and the Imperial buildings and dedications upon it.

6. Give a general account of the ancient Greek theatre, with a special note as to the existing remains of the Theatre of Dionysus at Athens.

Discuss Dr. Doerpfeld's theory as to the original arrangement of the stage of the Greek theatre and its subsequent modifications.

MODERN LANGUAGES

FIRST YEAR.

FRENCH.—(*First Paper.*)

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

(*Questions asked in French must be answered in French.*)

1. Traduire en français:

(*a*) An Italian inn is a habitation tolerable enough in summer; but in winter it is something of which one cannot conceive an idea.

Why have you not sent for him? Because we were waiting for his return.

What is he looking for? He is looking for his spectacles; I told him they were in the case, but he will not listen to me.

(*b*) If anyone tells you that you can get rich otherwise than by work and economy do not listen to him, he is a corrupter.

Do not trust a friend who flatters you; he who flatters you is not really your friend. He is really your friend who does not conceal the truth from you.

Nothing prevents us so much from being natural as the desire to look so.

(*c*) *The Lion, the Ass and the Fox.*—A lion, an ass and a fox entered into partnership, and went hunting. When they had killed a great quantity of game the lion ordered the ass to apportion it. The latter made three equal parts, and asked the lion to choose. The lion, who wanted to receive a larger share than the two others, flew into a passion and killed the ass. He then ordered the fox to make a new division. The latter gave the lion almost everything, and kept but very little for himself. "Who has taught thee to divide thus?" the lion asked him. "The accident which happened to the ass," replied the fox.

Other people's misfortunes ought to make us wise.

2. Donner en anglais les équivalents des gallicismes suivants :

(*a*) Y va-t-il de la vie? (*b*) Comme vous y allez! (*c*) Que voulez-vous, quand je m'y mets, je n'y vais pas de main morte. (*d*) De grâce, ne m'en veuillez pas! si nous en venons aux gros mots, ce sera à n'en plus finir! (*e*) Sur quoi la conversation a-t-elle roulé? Belle demande! sur la pluie et le beau temps. (*f*) De quoi s'agit-il? Il s'agit de savoir à quoi nous en tenir. (*g*) Ainsi, vous ne serez pas des nôtres ce soir? Mais si, votre bon conseil m'a fait changer d'avis. A la bonne heure!

3. (*a*) What are the disjunctive personal pronouns, and (*b*) when are they used in French?

4. State (*a*) general principles and (*b*) special rules concerning the place of adjectives.

5. What are the different ways to translate in French, the English possessive pronoun or adjective? Give examples.

6. Explain the use of *c'est* and *il est* (impersonal).

7. Traduire en anglais :

(*a*) Je souffre beaucoup de chanter ainsi. Cela me rappelle tous nos malheurs. Demain j'en serai malade; mais il le faut. Permettez-le-moi, mon frère. Souvenez-vous qu'à Ajaccio vous m'avez dit d'improviser pour amuser cette demoiselle anglaise qui se moque de nos vieux usages. Ne pourrai-je donc improviser aujourd'hui pour de pauvres gens qui m'en sauront gré, et que cela aidera à supporter leur chagrin?

Allons, fais comme tu voudras. Je gage que tu as déjà composé ta *ballata*, et tu ne veux pas la perdre.

Non, je ne pourrais pas composer cela d'avance, mon frère. Je me mets devant le mort, et je pense à ceux qui restent. Les larmes me viennent aux yeux, et alors je chante ce qui me vient à l'esprit.

(*b*) N'ayez peur de rien, Ors' Anton, dit le vieillard; *Ils* n'oseraient se montrer aujourd'hui. La souris rentre dans son trou lorsque revient le matou.

Matou toi-même, vieille barbe blanche! dit Orso. Comment t'appelles-tu?

Eh quoi! vous ne me connaissez pas, Ors' Anton,' moi qui vous ai porté en croupe si souvent sur mon mulet qui mord? Vous ne connaissez pas Polo Griffo? Brave homme, voyez-vous, qui est au-delà Rebbia corps et âme. Dites un mot, et quand votre gros fusil parlera, ce vieux mousquet, vieux comme son maître, ne se taira pas. Comptez-y, Ors' Anton.'

Bien, bien; mais, de par tous les diables! allez-vous en, et laissez-nous continuer notre route.

8. Raconter (*a*) la rencontre d'Orso et de Colomba, (*b*) leur départ d'Ajaccio et (*c*) leur voyage à Piétranera.

9. Décrire brièvement le rôle de *Gaston* ou d'*Antoinette* dans "Le Gendre de M. Poirier."

10. Ecrire quelques détails sur (*a*) la vie et (*b*) l'oeuvre de Prosper Mérimée.

FIRST YEAR.

FRENCH.—(*Second Paper.*)

MONDAY, APRIL 6TH, 1903:—AFTERNOON, 2 TO 5.

1. La captivité de Louis XVI. et de sa famille.

ou

Le procès de Louis XVI.

(environ 200 mots.)

2. Raconter une des fables suivantes:

Le meunier, son fils et l'âne.

Les animaux malades de la peste.

Le chêne et le roseau.

For students of McGill College and the R. V. C.

3. Raconter la visite de Germain chez la veuve Guérin (de 200 à 250 mots).

For students of Affiliated Colleges.

4. Raconter le "Siège de Berlin" (Daudet).

ou

Raconter l'histoire intitulée "Prix de gymnastique" dans les *Historiettes Modernes.*

SECOND YEAR.

FRENCH.—(*First Paper.*)

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

(*Toutes les réponses doivent se faire en français.*

1. Traduire:

La vieille obéit en toute hâte.

Il ne lui fit aucune recommandation; il était bien sûr qu'elle le garderait mieux qu'il ne se garderait lui-même.

On n'a jamais su comment il avait réussi à pénétrer dans la cour sans faire ouvrir la porte cochère. Il avait, et portait toujours sur lui, un passe-partout qui ouvrait une petite porte latérale; mais on avait dû le fouiller et lui prendre son passe-partout. Ce point n'a pas été éclairci.

Il monta l'escalier qui conduisait à sa chambre. Arrivé en haut, il laissa son bougeoir sur les dernières marches de l'escalier, ouvrit sa porte avec peu de bruit, et alla fermer à tâtons sa fenêtre et son volet, puis il revint prendre sa bougie et rentra dans sa chambre.

LES MISERABLES.

2. Raconter la conduite de l'évêque Myriel envers Jean Valjean et celle de Jean Valjean envers Fantine.

3. Traduire:

In his interesting work entitled "The Story of Africa," Dr. Brown relates a most romantic tale about Campagnon, a French trader and explorer, who flourished at the beginning of the eighteenth century. One day, as he was returning from fort St. Louis, at the mouth of the river Senegal, Campagnon found a lioness dying outside the walls of the town. The poor beast had been kept in captivity, but, having been attacked by a disease of the jaw, which is usually fatal, and being unable to eat, she had been abandoned to perish. Though her eyes were shut and her mouth was full of ants, Campagnon, thinking he saw signs of life, washed her mouth with water and poured milk down her throat. Ultimately she got better, and such was the affection the grateful animal felt towards her friend

that she would take no food but from his hands and followed him like a dog up and down the Isle of St. Louis.

4. (*a*) Traiter de la position des adjectifs et (*b*) donner la syntaxe de *nu, demi, feu* et des adjectifs désignant les couleurs.

5. Donner les règles relatives à (*a*) *quelque,* (*b*) *il est* et *c'est,* (*c*) *tout autre,* (*d*) *travers* et *au travers.*

6. Faire une brève analyse du Cid.

7. Donner des explications sur les sujets suivants: (*a*) Mots populaires et mots savants, (*b*) Rôle de l'accent tonique dans la transformation des mots latins en mots français. (*c*) Loi de la chûte des atônes.

8. Expliquer *phonétiquement* (*a*) *l's* comme signe du pluriel en français, et les locutions (*b*) grand'mère, (*c*) Bachelier ès-lettres.

9. (*a*) Indiquer quelques particularités relatives au pronom dans le vieux français, (*b*) et les principaux changements qu'a subis la conjugaison latine pour former les verbes français.

10. Rendre en anglais les expressions suivantes, prises de *Pêcheur d'Islande:*

(*a*) Accoudés à boire

(*b*) Un bon sourire à dents blanches.

(*c*) En plein sommeil.

(*d*) Elle avait été ramenée pour tout-à-fait au pays de ces pêcheurs.

(*e*) Il faisait les cent pas en fumant sa pipe.

(*f*) De loin en loin.

(*g*) A tue-tête.

(*h*) Elle n'en pouvait plus.

(*i*) C'est égal.

(*j*) Faire son entendu.

SECOND YEAR.

FRENCH.—(*Second Paper.*)

MONDAY, APRIL 6TH, 1903:—AFTERNOON, 2 TO 5.

1. Donner un résumé de l'intrigue du Bourgeois Gentilhomme.

2. Écrire (environ 200 mots) sur un des sujets suivants:

Les rapports entre Louis XIV. et Saint Simon.
Louis XIV comme roi.
La mort de Louis XIV.

3. Traduire en anglais:

(*a*) Il ne me parlait guère de ces choses-là, parce que je prenais la liberté de lui en faire honte. Je pris celle de le gouailler à ce récit, et de lui dire ce que je crus le pouvoir détourner d'ajouter foi et de s'amuser à ces prestiges, dans un temps surtout où il devait avoir l'esprit occupé de tant de grandes choses.

(*b*) Son premier saisissement des rênes de l'empire fut marqué au coin d'une extrême dureté et d'une extrême duperie. Fouquet fut le malheureux sur qui éclata la première; Colbert fut le ministre de l'autre, en saisissant seul toute l'autorité des finances, et lui faisant accroire qu'elle passait entre ses mains par les signatures dont il l'accabla à la place de celles que faisait le surintendant, dont Colbert supprima la charge, à laquelle il ne pouvait aspirer.

(*c*) Le roi voyait l'extrait de toutes les lettres où il y avait des articles que les chefs de la poste, puis le ministre qui la gouvernait, jugeaient devoir aller jusqu'à lui, et les lettres entières quand elles en valaient la peine par leur tissu ou par la considération de ceux qui étaient en commerce. Par là les gens principaux de la poste, maîtres et commis, furent en état de supposer tout ce qu'il leur plut, et à qui il leur plut.

4. Expliquer en français les termes suivants:

Tragédie, comédie de mœurs, comédie de caractère, les unités, préciosité, jansénisme, siècle de Louis XIV.

5. Qu'y a-t-il de nouveau (*a*) dans la tragédie de Corneille, (*b*) dans celle de Racine?

6. Raconter la vie de Molière.

7. Le roman français au XVIIe siècle.

8. Donner dans l'ordre chronologique les principales tragédies de Corneille.

9. Parler de l'importance de Malherbe et de Boileau.

POUR LA SECTION AVANCEE:

1. Parler du caractère et du style de Saint Simon.

2. Traduire en français:

The French Revolution broke out in 1789, and the

disorders which marked its beginning spread even into the theatres. One evening, at the Théâtre Français, an encounter took place in the parterre between the patriot party and the aristocratic party, and as it was thought that the boxes were filled mainly by the aristocrats, apples were thrown at several. The Duchesse de Biron, who was struck on the head by one, sent it the next day to Monsieur de la Fayette, with these words: "Allow me, sir, to offer you the first fruits of the Revolution which have reached me."

POUR LES ETUDIANTS DES COLLEGES AFFILIES:

1. Raconter la vie de Jean Jacques Rousseau; donner une liste de ses principaux ouvrages et parler de son influence.

2. Donner l'analyse de "Zaïre."

3. Ecrire (environ 200 mots) sur l'Encyclopédie et les Encyclopédistes.

THIRD AND FOURTH YEARS.

FRENCH.

FRIDAY, APRIL 3RD, 1903:—MORNING, 9 TO 12.

1. Faire l'analyse de Britannicus.

2. Examiner ce que Molière, Racine, Bossuet, Madame de la Fayette doivent à leur temps et établir en quoi leurs œuvres sont classiques, c'est-à-dire de tous les temps.

THIRD AND FOURTH YEARS.

FRENCH.—(*Second Paper.*)

FRIDAY, APRIL 3RD, 1903:— AFTERNOON, 2 TO 5.

1. Gaston Paris.

ou

L'histoire de l'alexandrin dans la poésie française.

2. L'influence du midi sur le cycle breton.

ou

Montrer que les chansons de geste et les romans de la table ronde correspondent à deux états successifs de la civilisation en France.

3. L'origine du drame médiéval.

ou

La mise en scène des mystères.

4. Les réformes proposées par du Bellay dans sa *Défense et Illustration de la langue française.*

ou

La vie de Montaigne.

5. Commenter les vers suivants de l'*Art Poetique:*

(*a*) Gardez donc de donner, ainsi que dans Clélie,
L'air ni l'esprit français à l'antique Italie,
Et, sous des noms romains faisant notre portrait,
Peindre Caton galant et Brutus dameret.

(*b*) Aimez donc la raison; que toujours vos écrits
Empruntent d'elle seule et leur lustre et leur prix.

(*c*) Evitons ces excès: laissons à l'Italie
De tous ces faux brillants l'éclatante folie.

MODERN LANGUAGE (HONOURS).

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 6.

LE DRAME.

1. (*a*) Discutez la nature de l'émotion dramatique; (*b*) dites ce qu'est en soi le drame, et (*c*) quelle est sa place parmi les arts.

2. Parlez du théâtre comique en France au XVe siècle, des trois genres principaux de pièces qu'il comprend.

3. Quelles furent les tentatives de renouvellement dramatique au XVIIIe siècle?

4. Esquissez à grands traits l'histoire du théâtre au temps de la Révolution et sous l'Empire.

5. Faites connaître le théâtre de l'école romantique, (*a*) ses principes, (*b*) ses défauts, (*c*) ses principaux représentants, (*d*) ses succès, (*e*) sa chute.

6. (*a*) Faites l'analyse de *Chatterton.*
(*b*) Quelle thèse de Vigny y soutient-il?
(*c*) Faites-en la critique.

THIRD AND FOURTH YEARS.

MODERN LANGUAGE HONOURS.

LITTÉRATURE.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

1. Faites connaître (*a*) les caractères du *classicisme*, et (*b*) l'œuvre particulière de chacun des précurseurs auxquels on peut faire remonter le mouvement d'où la littérature française contemporaine est sortie.

2. Qu'entendez-vous par les *pseudo-classiques?* Faites-en l'histoire.

3. Dites en quoi le romantisme a renouvelé
(*a*) la langue et la métrique,
(*b*) l'histoire,
(*c*) la critique,
(*d*) le roman.

4. Parlez de l'Evolution réaliste (*a*) en poésie, (*b*) dans le roman.

FIRST YEAR.

GERMAN.

(*Beginners' Class.*)

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

1. Translate:—

(*a*). Mühſam erhob ſich der Pfarrer von ſeinem Schrecken und überzeugte ſich allmählich, daß er einen ganz gebildeten und wohlwollenden jungen Mann vor ſich habe, den nur die Not und der wüſte Brauch des Krieges zur Gewaltthat trieb, und den er klüglich zu ſeinem Schutz im Hauſe müſſe zu feſſeln ſuchen. Das

ward ihm nicht schwer: denn er durfte den Pikenier nur auf die Geschichte der Rätsel seines Lebensganges bringen, die derselbe ja schon anspielend berührt hatte, und es ergab sich Amos bald behaglichem Erzählen und Plaudern, selber froh, wieder einmal einer feiner gearteten Natur zu begegnen.

(*b*) Und wenn er an sie zurückgedacht, dann sei es ihm gewesen, als blühe ihm das verlorene Paradies der Unschuld wieder auf in ihrer treuen Seele. Allein es wundere ihn, wie Marthe auch ihrerseits so feste Liebe ihm bewahrt, die sie doch nie ausgesprochen und nie erwidert gefunden habe. Marthe aber berichtete ihm fast mit den gleichen Worten, daß sie in all der Not der Schreckensjahre mit derselben ziellos sehnsüchtigen Liebe zu ihm sich hinüber geträumt, in welcher man der unschuldigen Kindheit als eines nie mehr zu gewinnenden und doch unverlorenen Kleinodes gedenke.

(*c*) Als Amos eben in einer Dorfschenke die Frühsuppe aß, setzte sich ein bewaffneter Mann neben ihn, der halb einem Soldaten, halb einem Landstreicher ähnlich sah. Der Mann kam von der Dill, und Amos suchte deshalb das Gespräch höchst behutsam so zu drehen, daß der Fremde von selber vom General Ramsay zu erzählen begann. Es werde dem General jetzt bald an den Kragen gehen, meinte jener; der Kaiser dränge den Grafen, daß er kurzen Prozeß mache, auch habe man bereits einen Sekretär Ramsay's eingefangen und auf kaiserlichen Befehl gefoltert. Man spüre nach Geständnissen über den geheimen Briefwechsel Ramsay's, nach Aktenstücken, die wider ihn zeugten, auch nach allerlei Kostbarkeiten, die der schlaue Schotte bei Seite geschafft habe.

Amos erschrak nicht wenig und gelobte sich doppelte Vorsicht.

1. Höchst behutsam Give other superlatives of behutsam. Distinguish them and show by sentences how they are used.

3. How are "point of time," "duration of time," "indefinite time" and "measure," expressed in German? Illustrate with brief examples.

4. Give the plurals and meanings of Band, Bank, Mann, Thor.

5. Explain the ambiguity in Ich habe ihn rufen hören

6. Would you say „Ich weiß das Gedicht" or „Ich kenne das Gedicht?" Explain.

7. Translate:—

(*a*) On a Saturday evening not long ago—it was the 7th of March—a bright red light was suddenly seen in the sky about half past eight, and everyone knew there was a big fire somewhere near the river.

(*b*) Thousands of people hastened to the place and found that the fine new steamboat that had been named after the City of Montreal was burning from one end to the other.

(*c*) It was hopeless to try to put such a fire out; one could only let it burn, and save all that was near it.

(*d*) Many persons had climbed on to a shed (*Schauer, n.*) in order to see better; but the roof fell in, and some were killed and many were injured (*verletzen*), both of those who were inside the shed and of those who were outside it.

8. What do you know about the author of Der Fluch der Schönheit? What is a Novelle and what characterizes it?

FIRST YEAR.

GERMAN.

(*Beginners' Class.*)

THURSDAY, APRIL 16TH, 1903:— AFTERNOON, 2 TO 5.

1. Translate:—

(*a*) Der Doktor hätte aber um keinen Preis der Welt der jungen Dame gegenüber etwas von der Ziegenbockangelegenheit verlauten lassen mögen, daher begnügte er sich zu sagen: „Lassen wir die Sache ruhen," und ging mit seiner Begleiterin in das andere Zimmer zurück.

(*b*) Der ungarische Graf sah den Doktor auf den Bock klettern, machte aber keine Miene zurückzutreten, sondern zwängte sich so gut es ging in den vollgestopften Wagen. Daß seine Anwesenheit Störung verursachte und bei dem größeren Teil der Gesellschaft eine Verstimmung hevorgerufen hatte, schien ihm gänzlich zu entgehen. Unbefangen fuhr er fort von Ungarns Herrlichkeit zu erzählen, undin der zunehmenden Dunkelheit bemerkte er den Mißmut nicht, der sich auf das Gesicht Mariens, an welche er hauptsächlich seine Worte richtete, gelagert hatte.

(*c*) Mit Herzklopfen und bangen Ahnungen war er die kanzleirätliche Treppe hinaufgestiegen und mit freudestrahlendem Gesicht kam er wieder hernnter. Seine Befürchtungen hatten sich als unbegründet erwiesen; die Kanzleirätin hatte, ein paar dicke Thränen vergießend, ihr schönes Kind in die Arme des glücklichen Doktors geführt, und der Kanzleirat hatte vor Rührung kaum seinen Segen sprechen können. Freilich, wenn der Bräutigam gehört hätte, mit welchen Worten die Kanzleirätin das Zwiegespräch beendigte, welches sie nach des Docktors Entfernung mit ihrem Theodor hielt, so würde seine Freud einigermaßen getrübt worden sein. Sie hatte nämlich gesagt. „Ein Sperling in der Hand ist besser als eine Taube auf dem Dach."

(*d*) rschienen nach und nach. Es waeGäDe sti nirereaherbee Gesellschaft, die Elite der hackelburger Bürgerschaft. Die Herren trugen samt und sonders das schwarz-weiße Habit, dicke Uhrketten und goldene Knöpfchen in allen Hemdknopflöchern. Die Damen rauschten herein in knitternder Seide und glänzten von Geschmeide, als ob sie einen Juwelierladen geplündert hätten.

2. Translate:—

There was once a wise merchant who had so much money that he could have covered the streets with it, had he wished to, but he made a better use (*Gebrauch*, m.) of it. When he died, his son got the money, and lived so merrily that it was soon all gone. As he had no more money and no more fine clothes, none of his friends remembered (*gedenken*) him. One of them,

however, gave him an old trunk (*Koffer*, m.) and advised him to pack up. As the poor fellow had nothing to pack, he crawled into the trunk himself. Hardly had he closed the lock (*Schloss*, n.) when the trunk flew up above the clouds, and carried him safely to a far country.

ANDERSEN.

3. Translate (at sight):—

(*a*) Was wollen die, dachte ich, zu dieser Stunde noch draußen m Garten? Mich schauderte, denn es fielen mir alle Mordgeschichten ein, die ich in meinem Leben gehört hatte. Indem ich noch so nachdenke, kommen Menschentritte, erst die Treppe herauf, dann auf dem langen Gange ganz leise, leise auf meine Thür zu, dabei war es, als wenn zuweilen Stimmen heimlich mit einander wisperten. Ich sprang schnell an das andere Ende der Stube hinter einen großen Tisch, den ich, sobald jemand eintrat, vor mir aufheben, und so mit aller Gewalt auf die Thür losrennen wollte. Aber in der Finsternis warf ich einen Stuhl um; da wurde es auf einmal ganz still draußen.

(*b*) Mit Ihnen tritt meine lange, glückliche Kinderzeit mir wieder vor die Augen; Alles, was sie von Freude und Schmerz gebracht, fühle ich so lebhaft wieder, als wäre ich noch der Knabe, der einst für Sie in den Wald ging und Vögel fing. Und doch ist die schöne Gestalt, welche ich vor mir sehe, von der Jugendfreundin so verschieden, daß ich merke, es ist nur ein holder Traum, den ich träume. Ih Augen glänzen so freundlich, wie sonst, aber ich habe kaum noch das Recht, an alte Träume zu ienken.

FIRST YEAR.

GERMAN.—(*First Paper.*)

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

1. Translate:—

(*a*) Adelheid. Weißt du was? Wir wollen wünschen, daß sie beide durchfallen. Diese Politiker!—Es war schlimm genug für dich, als nur einer Politik trieb; jetzt, da sie beide von dem sinnbethörenden Trank trinken, bist du auf alle Fälle geliefert.

Wenn ich jemals in die Lage käme, einen Mann zu meinem Herrn zu machen, ich würde ihm nur eine Bedingung stellen, die weise Lebensregel meiner alten Tante: Rauchen Sie Tabak, mein Gemahl, so viel Sie wollen, er verdirbt höchstens die Tapeten, aber unterstehen Sie sich nicht, jemals eine Zeitung anzusehen, das verdirbt Ihren Charakter.

(*b*) Piepenbrink. Da haben Sie ganz Recht gehabt. Und Sie haben Ihre brave Gesinnung auch bewiesen. Bei jeder Gelegenheit. Bei Armut, bei Teuerung, in Vormundschaften, auch bei unserm Schützenfest, überall, wo uns Bürgern ein wohlwollender und guter Mann Freude machte oder nützlich war, da sind Sie voran gewesen. Immer schlicht und treuherzig, ohne schnurrbärtiges Wesen und Hochmut. Daher kommt es denn, daß wir Sie allgemein lieben und verehren.

2. Comment briefly on: (*a*) Montecchi und Capuletti; (*b*) Das wäre abgemacht ("I suppose that's settled"); (*c*) Redaktionszimmer, Weihnachtsfest, des Nachts; (*d*) Gnadiges Fräulein.

3. Show that Freytag (an ex-professor) betrays his personal sympathies in his portraits of the two principal characters.

or

Give a brief account of Freytag's life up to the time of publication of *Die Journalisten*.

4. Translate:—

(*a*) Nichts Feindliches war zwischen uns geschehn,
Da kündigte mir Euer Ohm, der stolze,
Herrschwüt'ge Priester, der die freche Hand
Nach allen Kronen streckt, die Fehde an,
Bethörte Euch, mein Wappen anzunehmen,
Euch meine Königstitel zuzueignen,
Auf Tod und Leben in den Kampf mit mir
Zu gehn—Wen rief er gegen mich nicht auf?
Der Pu Zrirnestegen und der Völker Schwert,
Des frommen Wahnsinns fürchterliche Waffen;
Hier selbst, im Friedenssitze meines Reichs,
Blies er mir der Empörung Flammen an—

Doch Gott ist mit mir, und der stolze Priester
Behält das Feld nicht—meinem Haupte war
Der Streich gedrohet, und das Eure fällt!

(*b*) Die Natur
Warf diese beiden feur'gen Völkerschaften
Auf dieses Brett im Ocean; ungleich
Verteilte sie's, und hieß sie darum kämpfen,
Der Tweede schmales Bette trennt allein
Die heft'gen Geister; oft vermischte sich
Das Blut der Kämpfenden in ihren Wellen.
Die Hand am Schwerte, schauen sie sich drohend
Von beiden Ufern an, seit tausend Jahren.
Kein Feind bedränget Engelland, dem nicht
Der Schotte sich zum Helfer zugesellte;
Kein Bürgerkrieg entzündet Schottlands Städte,
Zu dem der Britte nicht den Zunder trug.
Und nicht erlöschen wird der Haß, bis endlich
Ein Parlament sie brüderlich vereint,
Ein Scepter waltet durch die ganze Insel.

5. Comment on two of the four following points:
(*a*) Mortimer's words: Es haßt die Kirche, die mich auferzog, der Sinne Reiz. (*b*) Es wurde vorgestellt die keusch Festung der Schönheit. (*c*) Es leben Götter, die den Hochmu rächen taken in conjunction with Seht! Ich will alles eine Schickung nennen. (*d*) The syntax and terminations in ein grimmig wütend Schicksal, ein lobenswürdig menschliches Gefühl, von rührend wundersamem Reiz.

6. What in your opinion is the proper attitude of a professional critic to the metrical irregularities of such a genius as Schiller?

or

Write on the use of Iambic Pentameter in German and English poetry.

7. Write on Schiller's expressed preference for historical subjects, his free manner of treating them, and the expedients to which he resorts in order to bring action into a play dealing with a person already condemned to death.

FIRST YEAR.

GERMAN.—(*Second Paper.*)

THURSDAY, APRIL 16TH, 1903:— AFTERNOON, 2 TO 5.

1. Translate into English:

(*a*) „Es ist etwas Großes," sagte er, „wenn man bedenkt, daß, damit ich hier in aller Ruhe meinen Thee schlürfen und du deine Pfeife rauchen kannst, der fleißige Chinese in jenem fernen Lande für uns pflanzt und der Neger für uns unter der Tropensonne arbeitet. Ja, das nicht allein, die großen Dampfer durchbrausen für uns in Sturm und Wogenschwall den mächtigen Ocean und die Karawanen ziehen durch die brennende Wüste. Der stolze millionenreiche Handelskönig, der in Hamburg in einem Palaste wohnt und am Ufer der Elbe einen fürstlichen Landsitz sein nennt, muß uns einen Teil seiner Sorge zuwenden und wenn ihm Handelsconjuncturen schlaflose Nächte machen, so liegen wir behaglich hingestreckt und träumen von schönen Dingen, und lassen ihn sich quälen, damit wir zu unserem Thee und unserem Tabak gelangen. Es schmeckt mir noch einmal so gut, wenn ich daran denke."

(*b*) (At sight.)

Du weißt, daß ich von Jugend auf mein ganzes Interesse jenen Organismen zuwendete, welche die dumme Menge die „niederen" nennt. Mein Werk „Die Grenze zwischen Tier- und Pflanzenleben" hat mir einen berühmten Namen gemacht und meine Berufung an unsere Universität zur Folge gehabt. Mir ist diese Welt des Winzigkleinen immer viel wunderbarer erschienen, als die Welt des Großen, und der Bau und die Lebensäußerungen dieser unscheinbaren Individuen schienen mir viel kunstreicher, rätselhafter und mannigfaltiger als jene der sogenannten höher entwickelten Pflanzen und Tiere und jene der Menschen.

2. Translate into German:

(*a*) A.—I can recommend the berries out in front of the shop. You will not find better ones in town. They are twelve cents a basket.

B.—Very well; let me have six baskets. You may also send me ten pounds of sugar, a pound of good coffee, and half a pound of black tea. Will you be able to send them soon?

A.—Yes; the boy will go in half an hour. Is there anything else you would like?

B.—No; that is all for the present. How much do I owe you altogether?

A.—Two dollars and twenty-one cents.

B.—Can you change a bill?

A.—I am very sorry; I haven't quite enough change.

B.—It doesn't matter; I will pay the boy when he brings the things. My husband will be sure to have change.

(*b*) (At sight.)

An old friend of mine has just came back from the South. I met him this morning in the street and asked him if he had had an agreeable winter. He answered that snow-storms were more to his liking than orange blossoms, and that he did not wish to see the face of a black for the next twenty years. We in the North, said he, have no idea of the situation down there. Ladies do not dare to go out unprotected at night. The blacks were much more reliable before the war than they are at the present time.

(*c*) He undressed hastily, sprang into the water, and drew out the sinking boy.

The countess considered it folly to travel with so large a body of servants.

After I have read the first chapter, I shall be in a better position to express an opinion.

We read in the fable that a lion once deemed a hare worthy of his friendship.

The entire army has fallen into the hands of the enemy.

The king must respect him, for he has just appointed his son an officer.

We were just about to start, when we received news of the death of a near relative.

Although the hotel was very bad, we should have remained in it, if the landlord had been more polite.

3. Write on one of the following subjects, giving examples:

Partitive genitive.

Agreement of subject and predicate.

Syntax of the definite article.

4. Give the principle parts of the strong and mixed verbs in 1 (*a*) and (*b*).

SECOND YEAR.

GERMAN.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. Translate and briefly explain the context and the allusions marked with a *:—

(*a*) Götz. Bist du nicht eben so frei, so edel geboren als einer in Deutschland; unabhänzig, dem Kaiser unterthan, und du schmiegst dich unter Vasallen? Verkennst den Wert eines freien Rittermanns,* der nur abhängt von Gott, seinem Kaiser und sich selbst! Verkriechst dich zum ersten Hofschranzen eines eigensinnigen, neidischen Pfaffen!*

Weislingen. Du siest die Fürsten an, wie der Wolf den Hirten. Und doch, darfst du sie schelten, daß sie ihrer Leut und Länder Bestes währen? Sind sie denn einen Augenblick vor den ungerechten Rittern* sicher, die ihre Unterthanen auf allen Straßen anfallen, ihre Dörfer und Schlösser verheeren? Wenn nun auf der anderen Seite unseres teuren Kaisers Länder der Gewalt des Erbfeindes* ausgesetzt sind, er von den Ständen Hilfe begehrt, und sie sich kaum ihres Lebens erwehren: ist's nicht ein guter Geist, der ihnen einrät, auf Mittel zu denken Deutschland zu beruhigen? Und uns verdenkst du's daß wir uns in ihren Schutz begeben, deren Hilfe uns nah ist, statt daß die entfernte Majestät* sich selbst nicht beschützen kann?

(*b*) Hauptmann] Ich möcht' euch alle mit eigner Hand umbringen! Was, fortlaufen * Er hatte keine Handvoll Leute mehr!—Reit herum, ihr, und ihr, und ihr. Wo ihr von unsern zerstreuten Knechten findt, bringt sie zurück oder stecht sie nieder.

Wir müssen diese Scharten auswetzen, und wenn die Klingen drüber zu Grunde gehen sollten.

(*c*) Rat. Einem Räuber sind wir keine Treue schuldig.

Götz. Trügst du nicht das Ebenbild des Kaisers, das ich in dem gesudeltsten Konterfei verehre, du solltest mir den Räuber fressen oder dran erwürgen! Ich bin in einer ehrlichen Fehd* begriffen. Du könntest dich vor der Welt groß machen, wenn du in deinem Leben eine so edle That* gethan hättest, wie die ist, um welcher willen ich gefangen sitze.

2. Translate:—

Whenever a soldier appeared in a regiment of King Frederick the Great for the first time, the latter always put (*richten*) three questions to (*an*) him, and usually in the same order. Firstly, he asked how old the soldier was; secondly, how long he had been in the service; and thirdly, if he was satisfied with his pay (*Sold*) and rations (*Brot*). One day the King espied a young Frenchman on parade whom he had not seen before. The soldier, being unable to speak German, had been advised by his captain to learn the answers to the questions by heart. This time, however, the King began by asking him how long he had served. The soldier replied, "Twenty-one years." Then he inquired how old he was, whereupon he received the answer, "Three months." 'Well," exclaimed the King, "either you are a fool or I am one!" The soldier thought of course that was the third question, and answered promptly, "Both, your Majesty." The King was not a little surprised at the answer, and inquired of the soldier if he had understood the questions at all. The man replied in French that he did not know a word of German. Frederick at once perceived how amusing the incident (*Vorfall*) was, and laughing heartily told him he had made a good beginning with the language and should go on studying it with the same diligence.

3. Explain Grimm's Law. Give English cognates of *kriechen, Pfaffe, Fürst, schelten, Dorf, Hilfe, statt, Knecht, wetzen, Unterthan,* with any remarks you think needful.

4. (i) Comment on use of *welcher* in 1 (*c*). (ii.) What is the force of prefix in *verkennen, verkriechen, verheeren, verehren, verachten?*

5. Render the following into English:—

Er zieht den Kürzern—Vor Jahr und Tag—Er hat es ihm weis gemacht—Es macht alles hohle Pfötchen—Er hat ihn beim Lappen—Es wird schwer halten—Sie kommen mit hellem Hauf—Diesmal galt's—Das fehlte noch—Was sich widersetzt, niedergestochen!

6. In how many ways may a command be expressed in German? Examples.

7. Express in German: He has gone away for three days. He has not been here for a week. I have known her for a year and a half. What do you take me for? He will not return for an hour, will you wait for him?

8. Geben Sie kurze Erklärungen über:—Faustrecht, Urfehde, Landfrieden, Fehmgericht, Bauernkrieg, der wilde Jäger.

SECOND YEAR.

GERMAN.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. Translate:—

Die Achtung vor fremdem Eigentum verschwand. Im Anfange des Krieges waren die Nachbardörfer einander hilfreich gesinnt. Wenn die Soldaten in dem einen Dorfe Vieh forttrieben und dasselbe bei der nächsten Nachtrast wieder verkauften, so gaben die Käufer den neuen Erwerb oft den frühern Eigentümern um den Einkaufspreis zurück. Allmählig aber begann der Landmann zu stehlen und zu rauben wie der Soldat. Bewaffnete Haufen rotteten sich zusammen, zogen über die Landesgrenze in andere Dörfer und entführten, was sie bedurften. Sie lauerten den Nachzüglern der Regimenter in dichtem Walde oder in Gebirgspässen auf und nahmen oft nach hartem Kampf an dem Leben der Bezwungenen eine rohe Rache, ja sie überboten die Soldaten

in Erfindung von Todesqualen, und es wird wenige Waldhügel geben, in deren Schatten nicht greuliche Unthat von solchen verübt ist, welche dort früher als friedliche Holzfäller und Steinbrecher ihr kunstloses Lied gesungen hatten.

2. Erzählen Sie ausführlich (wenigstens 2 Seiten) den Inhalt der Balladen, in welchen folgende Worte sich finden;

(*a*) „Des Lebens ungemischte Freude
Ward keinem Irdischen zu Teil."

(*b*) „Der ist besorgt und aufgehoben,
Der Graf wird seine Diener loben."

(*c*) "Und der Mensch versuche die Götter nicht,
Und begehre nimmer und nimmer zu schauen,
Was sie gnädig decken mit Nacht und Grauen."

3. Answer *three* of the following:—

(i) What is a ballad? When were most of Schiller's ballads written? What is their general character?

(ii) Into what periods may German Literature be divided? Give the dates of each and write briefly on the author you think the most important and give an outline of his principal work.

(iii) When did "Gœ von Berlichingen" appear? What led Goethe to write it? Discuss its literary value, and the character of the hero.

(iv) Name the authors and indicate generally the nature of the following works, with approximate dates: —

Tristan und Isolde, Hildebrandslied, Simplicissimus Messias, Nathan der Weise, Stimmen der Völker in Liedern, Volksbuch von Dr. Faust, Wallenstein, Wilhelm Meister's Lehrjahre, Oberon, Harold.

4. Translate (at sight):—

Des Abends komme ich zurück zu Tische, es waren noch Wenige in der Gaststube; die würfelten auf einer Ecke, hatten das Tischtuch zurückgeschlagen. Da kommt der ehrliche A . . . hinein, legt seinen Hut nieder, indem er mich ansieht, tritt zu mir und sagt leise: „Du hast Verdruß gehabt?" „Ich?" sagte

ich. „Der Graf hat Dich aus der Gesellschaft gewiesen."—„Hole sie der Teufel!" sagte ich; mir war's lieb, daß ich in die freie Luft kam."—„Gut," sagte er, „daß Du es auf die leichte Achsel nimmst! Nur verdrießt mich's, es ist schon überall herum."—Da fing mich das Ding erst zu wurmen an. Alle, die zu Tische kamen und mich ansahen, dachte ich, die sehen Dich darum an! Das gab böses Blut.

Und da man nun heute gar, wo ich hintrete, mich bedauert; da ich höre, daß meine Neider triumphieren und sagen: da sähe man's, wo es mit den Uebermütigen hinausginge, die sich ihres Bischen Kopfs überhöben und glaubten sich darum über alle Verhältnisse hinaussetzen zu dürfen, und was des Hundegeschwätzes mehr ist—da möchte man sich ein Messer ins Herz bohren. Denn man rede von Selbständigkeit, was man will, den will ich sehen, der dulden kann, daß Schurken über ihn reden, wenn sie einen Vorteil über ihn haben. Wenn ihr Geschwätze leer ist, ach, da kann man sie leicht lassen.

—Goethe; Werthers Leiden.

THIRD AND FOURTH YEARS.

GERMAN.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. Warum denn jetzt, der du so oft gewalt'ge Sorgen gleich Seifenblasen dir vom Haupte weggewiesen, warum vermagst du nicht die Ahnung zu verscheuchen, die tausendfach in dir sich auf und nieder treibt? Seit wann begegnet der Tod dir fürchterlich, mit dessen wechselnden Bildern, wie mit den übrigen Gestalten der gewohnten Erde, du gelassen lebtest? Auch ist er's nicht, der rasche Feind, dem die gesunde Brust wetteifernd sich entgegengesehnt; der Kerker ist's, des Grabes Vorbild, dem Helden wie dem Feigen widerlich. Unleidlich ward mir's schon auf meinem gepolsterten Stuhle, wenn in stattlicher Versammlung die Fürsten, was leicht zu entscheiden war, mit wiederkehrenden Gesprächen überlegten und zwischen düstern Wänden eines Saals die Balken der Decke mich erdrückten. Da eilt' ich fort, sobald es möglich war, und rasch auf's Pferd mit tiefem Atemzuge. Und frisch hinaus, da wo wir hingehören! in's Feld, wo aus der Erde dampfend jede nächste Wohltat der Natur, und durch den Himmel wehend alle Segen der Gestirne uns umwittern.

Übersetzen Sie diese Rede Egmonts und erläutern Sie den Zusammenhang. Was haben Sie über die Sprache zu bemerken?

2. Ernst ist der Anblick der Nothwendigkeit.
Nicht ohne Schauder greift des Menschen Hand
In des Geschicks geheimnisvolle Urne.
In meiner Brust war meine That noch mein;
Einmal entlassen aus dem sichern Winkel
Des Herzens, ihrem mütterlichen Boden,
Hinausgegeben in des Lebens Fremde,
Gehört sie jenen tück'schen Mächten an,
Die keines Menschen Kunst vertraulich macht.

In welchem Zusammenhang spricht Wallenstein die obigen Worte? Was ist Wallensteins Idee vom Schicksal? Welchen Einfluß übt diese Idee auf Wallensteins Handlungsweise aus?

Ist die Rolle des Max nothwendig?

3. Uebersetzen Sie:

Der Sonne Licht ist unter,
Herab steigt ein verhängnisvoller Abend—
Sie macht ihr Dünkel sicher. Wehrlos gibt sie
Ihr böser Stern in unsre Hand, und mitten
In ihrem trunknen Glückeswahne soll
Der scharfe Stahl ihr Leben rasch zerschneiden.
Ein großer Rechenkünstler war der Fürst
Von jeher, alles wußt'er zu berechnen,
Die Menschen wußt'er, gleich des Brettspiels Steinen,
Nach seinem Zweck zu setzen und zu schieben,
Nicht Anstand nahm er, andrer Ehr' und Würde
Und guten Ruf zu würfeln und zu spielen—
Gerechnet hat er fort, und fort, und endlich
Wird doch der Kalkul irrig sein; er wird
Sein Leben selbst hineingerechnet haben,
Wie jener dort in seinem Zirkel fallen.

Welchen Buttler haben wir hier?

4. Uebersetzen Sie:

Seit einiger Zeit trug sich Herr Meyhöfer mit großen Plänen. Er hatte entdeckt, daß das Torfmoor, welches das Heidegehöft in

weitem Bogen umspannte, einen sicheren Verdienst zu geben im stande war. Schon zwei oder drei Mal, wenn ihm das Messer an der Kehle saß, hatte er als äußersten Nothbehelf Torf stechen lassen und je fünf einspännige Fuhren nach der Stadt geschickt. Heimlich ganz heimlich—denn war zu stolz, um für einen ganz gewöhnlichen Torfbauern gehalten zu werden. Seine Leute hatten dann jedes Mal zwanzig bis fünfundzwanzig Mark Barerlös heimgebracht und erzählt, daß noch weit mehr auf diese Art zu gewinnen wäre, weil schwarzer, fester Torf auf dem Markte ein sehr begehrter Artikel sei.

„Sudermanns Charaktere sind ziemlich zusammenhangslos aus interessanten Momenten zusammengesetzt." Geben Sie Beispiele us „Frau Sorge."

5. Goethe als Dichter der Liebe.

6. Uebersetzen Sie:

Dem Verehrer Goethes ist das Studium dieser Eigenheiten des Alters, das die Dinge nicht beim rechten Namen nennen mag und deshalb umgeht und umschreibt, immer interessant, wenn auch wenig lohnend gewesen, dagegen hat der Dichter für die Schöpfungen aus dieser Periode, mit Ausnahme von Dichtung und Wahrheit und allenfalls der Wahlverwandschaften, zweier Werke bei denen das allegorische Versteckenspielen durch die Natur die Sache ausgeschlossen war, bei dem größeren Publikum weder Theilnahme vorausgesetzt noch gefunden. Der Leserkreis seiner einzeln neu erscheinenden Schriften wurde immer zerstreuter und enger während die gesammelten Werke in immer weitere Kreise drangen Die Gesammterscheinung trat bedeutungsvoller, Ehrfurcht gebietend hervor; die wissenschaftlichen Richtungen und die Liebhabereien an sich konnten nur beschränkt wirken. In den Jahren 1806 bis 1808 war die Sammlung von Goethes Werken in zwölf Bänden erschienen, die nach gewissen inneren Beziehungen geordnet, das Neueste neben dem Frühesten, ohne Rücksicht auf die Entstehungszeit, vor die Augen des Lesers brachten und in diesen wenigen Bänden die Ausbeute eines fast sechzigjährigen Lebens und fast vierzigjährigen schriftstellerischen Wirkens aufstellten.

THIRD AND FOURTH YEARS.

GERMAN.

TUESDAY, APRIL 7TH, 1903:—AFTERNOON, 2 TO 5.

A.

THE CONVERSION OF CLOVIS.

Till the thirtieth year of his age Clovis continued to worship the gods of his ancestors, but his subjects of Gaul enjoyed complete religious liberty. The Merovingian prince had contracted a fortunate alliance with the fair Clotilda, the niece of the king of Burgundy, who, in the midst of an Arian court, had been educated in the profession of the Catholic faith. It was not only her interest, but her duty to convert her pagan husband, and Clovis insensibly listened to the voice of love and religion. He consented to the baptism of his eldest son; and though the sudden death of the infant excited some superstitious fears, he allowed himself to be persuaded, a second time, to repeat the dangerous experiment. In the distress of the battle of Tolbiac, Clovis loudly invoked the God of Clotilda and the Christians; and victory disposed him to listen with respectful gratitude to the eloquent Remigius, bishop of Reims, who made clear to him the temporal and spiritual advantages of his conversion. The king declared himself satisfied of the truth of the Catholic faith, and the political reasons which might still stand in the way of his public profession were removed by the acclamations of his loyal Franks, who showed themselves alike prepared to follow their heroic leader to the field of battle or to baptism.

B.

1. Das Verhältnis zwischen Goethe und Schiller und dessen Einfluß auf die literarische Thätigkeit der beiden Dichter.
2. Die Leiden des jungen Werther.
3. Goethe als dramatischer Dichter.
4. Die hervorragendsten Schriftsteller der Romantischen Schule.
5. Grillparzer als Erbe Goethes.
6. Welche Einflüsse haben auf Heine eingewirkt?

THIRD AND FOURTH YEARS.
GERMAN (HONOURS).

SATURDAY, APRIL 11TH, 1903:—AFERNOON, 2 TO 5.

1. Übersetzen Sie sorgfältig ins Englische, und besprechen Sie kurz den Zusammenhang folgenden Auszugs:

Bedenke ich es aber jetzt genauer, so finde ich hier den Keim der Nichtachtung, ja der Verachtung des Publikums, die mir eine ganze Zeit meines Lebens anhing und nur spät durch Einsicht und Bildung ins Gleiche gebracht werden konnte. Genug, schon damals war das Gewahrwerden parteiischer Ungerechtigkeit dem Knaben sehr unangenehm, ja schädlich, indem es ihn gewöhnte, sich von geliebten und geschätzten Personen zu entfernen. Die immer auf einander folgenden Kriegsthaten und Begebenheiten ließen den Parteien weder Ruhe noch Rast. Wir fanden ein verdrießliches Behagen, jene eingebildeten Uebel und willkürlichen Händel immer von frischem wieder zu erregen und zu schärfen, und so fuhren wir fort, uns unter einander zu quälen.

2. Ist der Titel „Dichtung und Wahrheit" treffend? Wann und warum schrieb Goethe seine Autobiographie?

3. Welche Umstände übten den größten Einfluß auf die Bildung des Charakters des jungen Goethe?

4. Geben Sie Erläuterungen über:—Pfeifergericht, Kauderwelsch, Charfreitag, Schlendrian, Volksbücher.

5. Behandeln Sie drei der folgenden Gegenstände:—

(i.) Der Einfluß Frankreichs auf deutsche Dichtung und Sprache im 12ten. und 13ten. Jh.

(ii.) Die Klosterliteratur vor der ersten Blütezeit.

(iii.) Die Ursachen des Verfalls der Dichtung im 13ten Jh.

(iv.) Der sittliche Wert des „Parzival"

(v.) Hartmann von Aue oder Walther von der Vogelweide

GERMAN HONOURS.

PHILOLOGY.

SATURDAY, APRIL 11TH:—MORNING, 9 TO 1.

1. (*a*) Dô truoc man der frouwen swaere unde grôz,
einen vil schërfen gêr, dens zallen zîten schôz,
starc und ungefuege, michel unde breit,
der ze sinen ecken vil freislichen sneit.
Prünhilde sterke groezlichen schein.
man truoc ir zuo dem ringe einen swaeren stein,
grôz, und ungefuege, michel unde wel:
in truogen kûme zwelve der kuenen helde unde snel.
An ir vil wize arme si die ermel want,
si begunde vazzen den schilt an der hant,
den gêr si hôhe zucte: dô gie an den strît.
die *ellenden* geste vorhten Prünhilde nît.
Unde waere im Sifrit niht dâ ze helfe komen,
so hete sie Gunther sinen lip benomen.
er gie dar tougenliche und ruort im sîne hant.
Gunther sine liste harte sorclich ervant.

(*b*) Der künic von Burgonden klagete sinen tôt.
dô sprach der verchwunde: daz ist âne nôt,
daz der nâch schaden weinet, der in dâ hât getân.
der dienet michel schelden; ez waere bezzer verlân.
Dô sprach der grimme Hagene: jane weiz ich, waz ir *kleit*.
ez hât nu allez ende unser sorge und unser *leit*:
wir vinden ir vil wênic, die geturren uns bestân.
wol mich, deich sîner hêrschaft hân ze râte getân!
Ir muget iuch lîhte ruemen, sprach dô Sifrit.
het ich an iu erkennet den mortlîchen sit,

ich hete wol behalten vor iu mînen *lîp*.
mich riuwet niht sô sêre sô vrou Kriemhilt mîn wîp.
Nu mûeze got erbarmen, deich ie gewan den sun,
dem man daz itewîzen sol nâch den ziten tuon,
daz sîne mâge iemen mortlîche hân erslagen.
moht ich, sô sprach Sîfrit, daz sold ich pillîche klagen.
Dô sprach vil jaemerlîche der verchwunde man:
welt ir, künic edele, triuwen iht begân
in der *werlt* an iemen, lât bevolhen sin
ûf iuwer genâde die lieben triutinne mîn.
(*c*) Ir sult sprechen willekomen:
der iu maere bringet, daz bin ich.
Allez daz ir hapt vernomen,
daz ist gar ein wint: nû frâget mich.
Ich wil aber miete:
wirt mîn lôn iht guot,
ich sage iu vil lîhte, daz iu sanfte tuot.
seht, waz man mir êren biete.

ich wil tiuschen frouwen sagen
solhiu maere, daz si deste baz,
Al der werlte suln behagen:
âne grôze miete tuon ich daz.
Waz wold ich ze lône?
si sint mir ze her;
sô bin ich gefuege und bites *nihtes* mêr,
wan daz si mich gruezen schône.

Ich hân lande vil gesehen
unde nam der besten gerne war:
Ubel mueze mir geschehen,
kunde ich ie mîn herze bringen dar,
Daz im wol gevallen
wolde fremeder site.
nû waz hulfe mich, ob ich unrehte strite?
tiuschiu zuht gât vor in allen.
(*d*) Dem maere gienc si lange nâch.
eins tages si in kapfen sach
ûf die boume nâch der vogele schal.
si wart wel innen, daz zeswal
von der stimme ir *kindes* brust

des twanc in art und sîn gelust.
frou Herzeloyde kêrt ir haz
an die vogele, sine wesse um waz:
si wolt ir schal verkrenken.
ir bûliute unde ir enken
die hiez si *vaste* gâhen, vogele würgen und vâhen.
die vogele wâren baz geriten:
etsliches sterben wart vermiten:
der bleip dâ lebendic ein teil,
die sît mit sange wurden geil.
Der knappe sprach zer kûnegin:
waz wizet man den vogelîn?
er *gert* in frides sâ zestunt.
sîn muoter kust in an den munt,
diu sprach: wes wende ich sîn gebot,
der doch ist der hochste got?
suln vogele durch mich freude lân?
der knappe sprach zer muoter sân:
ôwê, mueter, waz ist got?
sun, ich sage dirz âne spot:
er ist noch lichter denne der tac.
der antlitzes sich bewac
nâch menschen antlitze.

(*e*) (*unseen*)

Eis mâls ein jude welte gân
dur einen walt, dô muest er hân
geleite, wan der *walt* was vol
morder; daz wist der jude wol.
zuo dem kûnge er dô kan,
und bat geleit, daz solt du hân!
sprach der kûnic und gebôt
sinem schenken ûf den tôt,
daz er in solt geleiten wol.
daz tuon ich, als ich billich sol,
sprach der schenke, dô zehant
nam er den juden an sîn hant
und vuort in ûf die strâze.
der jude truoc unmâze
vil goldes ûf der selben vart·
der schenke des wel inne wart.
in sinem muote er sêre vaht

(wan stunt and stat vil dieben macht)
wie er dem juden taet den tôt.
er gedaht: du kunst ûz aller nôt,
wirt dir daz golt, wer wil ez sagen,
oder wer mac ûf dich denne
klagen?
du bist allein; hab gueten muet!
umb disez mort dir niemen tuot.
dô der jude daz ersach,
vil tief er siufzet unde sprach:
ich zwivel niht, und weiz ez wol,
daz disez mort got offnen sol.
ê daz ez wurd verswigen gar,
die vogel machtenz offenbâr,
die hie vliegent, samer got!

(*f*) Was haben Sie über die unterstrichenen Wörter zu bemerken?

(*g*) Was ist die geschichtliche Grundlage des Nibelungenlieds?

2. Was wird aus germanischem au, ai, ê, ô und iu im ahd?

3. Auf welche mhd. Vokale gehen die nhd. Vokale zurück?

4. Was versteht man unter grammatischem Wechsel?

5. Was is Hochdeutsch?

6. Was ist die zweite Lautverschiebung? Haben sich die hd. Consonanten noch weiter verandert?

7. Geben Sie die Geschichte der wichtigsten Diclinationsformen im Deutschen?

8. Wie erklären Sie den Umlaut in älter?

9. Was versteht man unter Brechung und Rückumlaut?

10. Auf welche Weise bildete das Germanische das Præteritum?

11. Was sind Præterita-Præsentia?

12. Was haben Sie über das t in folgenden Wörtern zu bemerken: bist, einst, wert?

SEMITIC LANGUAGES

SECOND YEAR.

HEBREW.

FRIDAY, APRIL 3RD, 1903:—

AFTERNOON, 2 TO 5.

I. Translate literally:—

וַיֹּאמֶר לֶמֶךְ לְנָשָׁיו עָדָה וְצִלָּה שְׁמַעַן קוֹלִי נְשֵׁי לֶמֶךְ
הַאְזֵנָה אִמְרָתִי כִּי אִישׁ הָרַגְתִּי לְפִצְעִי וְיֶלֶד לְחַבֻּרָתִי: כִּי
שִׁבְעָתַיִם יֻקַּם־קָיִן וְלֶמֶךְ שִׁבְעִים וְשִׁבְעָה: וַיֵּדַע אָדָם עוֹד
אֶת־אִשְׁתּוֹ וַתֵּלֶד בֵּן וַתִּקְרָא אֶת־שְׁמוֹ שֵׁת כִּי שָׁת־לִי
אֱלֹהִים זֶרַע אַחֵר תַּחַת הֶבֶל כִּי הָרָגוֹ קָיִן: וּלְשֵׁת גַּם־
הוּא יָלַד־בֵּן וַיִּקְרָא אֶת־שְׁמוֹ אֱנוֹשׁ אָז הוּחַל לִקְרֹא בְּשֵׁם
יְהוָה:

1. Parse five weak verbs in tha section.
2. Characteristics of פ״נ verbs in Hophal.
3. Meaning of the proper names found in those verses.
4. Describe the various kinds of Parallelism in Hebrew poetry.
5. Render into Hebrew: (*a*) Cain built the city Enoch.—(*b*) Lamech had two wives,— (*c*)Adam was the father of Abel and Abel was the brother of Cain.

II. Translate literally:—

שָׁמוֹר אֶת־יוֹם הַשַּׁבָּת לְקַדְּשׁוֹ כַּאֲשֶׁר צִוְּךָ יְהוָה אֱלֹהֶיךָ:
שֵׁשֶׁת יָמִים תַּעֲבֹד וְעָשִׂיתָ כָּל־מְלַאכְתֶּךָ: וְיוֹם הַשְּׁבִיעִי
שַׁבָּת לַיהוָה אֱלֹהֶיךָ לֹא־תַעֲשֶׂה כָל־מְלָאכָה אַתָּה
וּבִנְךָ־וּבִתֶּךָ וְעַבְדְּךָ וַאֲמָתֶךָ וְשׁוֹרְךָ וַחֲמֹרְךָ וְכָל־בְּהֶמְתֶּךָ

וְגֵרְךָ אֲשֶׁר בִּשְׁעָרֶיךָ לְמַעַן יָנוּחַ עַבְדְּךָ וַאֲמָתֶךָ כָּמוֹךָ׃
וְזָכַרְתָּ כִּי־עֶבֶד הָיִיתָ ׀ בְּאֶרֶץ מִצְרַיִם וַיֹּצִאֲךָ יְהוָה אֱלֹהֶיךָ
מִשָּׁם בְּיָד חֲזָקָה וּבִזְרֹעַ נְטוּיָה עַל־כֵּן צִוְּךָ יְהוָה אֱלֹהֶיךָ
לַעֲשׂוֹת אֶת־יוֹם הַשַּׁבָּת׃ ס כַּבֵּד אֶת־אָבִיךָ וְאֶת־אִמֶּךָ
כַּאֲשֶׁר צִוְּךָ יְהוָה אֱלֹהֶיךָ לְמַעַן ׀ יַאֲרִיכֻן יָמֶיךָ וּלְמַעַן יִיטַב
לָךְ עַל הָאֲדָמָה ׀ אֲשֶׁר־יְהוָה אֱלֹהֶיךָ נֹתֵן לָךְ׃

1. Compare the fourth commandment in that section and in Exodus xx.
2. Parse שֵׁשֶׁת, צִוְּךָ, לְקַדְּשׁוֹ
3. Inflect עשה in the Niphal Imperfect.
4. Inflect עֶבֶד (singular and plural).
5. Name and force of accents in the first verse.
6. Parse the irregular nouns found in that section.

III. Translate literally :—

לָמָּה רָגְשׁוּ גוֹיִם וּלְאֻמִּים יֶהְגּוּ־רִיק׃ יִתְיַצְּבוּ ׀ מַלְכֵי־אֶרֶץ
וְרוֹזְנִים נוֹסְדוּ־יָחַד עַל־יְהוָה וְעַל־מְשִׁיחוֹ׃ נְנַתְּקָה אֶת־
מוֹסְרוֹתֵימוֹ וְנַשְׁלִיכָה מִמֶּנּוּ עֲבֹתֵימוֹ׃ יוֹשֵׁב בַּשָּׁמַיִם יִשְׂחָק
אֲדֹנָי יִלְעַג־לָמוֹ׃ אָז יְדַבֵּר אֵלֵימוֹ בְאַפּוֹ וּבַחֲרוֹנוֹ יְבַהֲלֵמוֹ׃
וַאֲנִי נָסַכְתִּי מַלְכִּי עַל־צִיּוֹן הַר־קָדְשִׁי׃ אַסַּפְּרָה אֶל־חֹק
יְהוָה אָמַר אֵלַי בְּנִי אַתָּה אֲנִי הַיּוֹם יְלִדְתִּיךָ׃ שְׁאַל מִמֶּנִּי
וְאֶתְּנָה גוֹיִם נַחֲלָתֶךָ וַאֲחֻזָּתְךָ אַפְסֵי־אָרֶץ׃

1. Explain the anomalous form יֶהְגּוּ
2. Parse fully נוֹסְדוּ, נְנַתְּקָה, מוֹסְרוֹתֵימוֹ.
3. Characteristics of פ״נ verbs in Niphal and Hiphil.
4. Inflect דָּבַר in the Piel Imperfect.
5. Inflect בָּשָׂר in the singular. Plural of חֹק

IV. Point and translate: ידע א" כי ביום אכלכם ממנו ונפקחו עיניכם והייתם כאלהים ידעי טוב ורע.

V. 1. Explain the nature of the מְסֹרָה.

2. Explain the letters בפפ, ססס.

3. Explain the terms Keri velo Chethib, Chethib velo Keri, Keri ouchethib.

4 Ponslate rnuttiaad חזק, דספר, חציו, פרישיותיו, סדריו, סימז, פרהיו.

THIRD AND FOURTH YEARS.

HEBREW.

FRIDAY, APRIL 3RD, 1903:—

AFTERNOON, 2 TO 5.

Translate literally Isaiah 55, 1 to 6 inclusive.

1. Inflect the Kal Imperative of יָלַךְ
2. Meaning of the root מְחִיר
3. Inflect לֶחֶם in the singular.
4. Analyze and parse וְיִגְיַעֲכֶם
5. Principle of Syntax applying to שִׁמְעוּ שָׁמוֹעַ
6. Parse הַטּוּ and state the principles governing that form
7. ל"ה verbs with a vowel and a Consonant termination.
8. Write down the full form of תִּהְיִי
9. Comment on the expression כְּרַת בְּרִית
10. Greek and Latin for בְּרִית and עוֹלָם
11. What kind of Genitive is חַסְדֵי דָוִד
12. Point and translate the Masoretic note in לְאוּמִּים
13. Tabular view of נָגַד in the Hiphil.
14. Parse and analyze בְּהִוֹתוֹ, בְּהִמָּצְאוֹ, פְּאַרְךָ
15. Render into Hebrew: When the wicked forsake hisway the Lord has mercy upon them.

II. Translate literally Job 14, 7 to 11 inclusive.

1. Parse יוֹנַקְתּוֹ
2. Account for the vowels in תֶּחְדָּל
3. Plural of שֹׁרֶשׁ
4. Analyze בֶּעָפָר
5. Inflect the Hiphil Imperfect of מות
6. Comment on verse 10.

II. Translate Job 19, 21 to 27.

1. Parse חָנֵנִי and translate it into Latin.
2. Comment on the various translations of verses 25 to 27.
3. Render into Hebrew: His words are engraved in the rock with an iron stylus.

IV. Translate Psalm 23, with notes on the uncommon forms and unusual weak verbs.

V. Point and translate the the Masoretic notes at the end of the Book of Job.

THIRD AND FOURTH YEARS.

ARAMAIC AND SEMITIC LITERATURE.

MONDAY, APRIL 20TH, 1903:—AFTERNOON, 2 TO 5.

I. Translate literally:—

1. Targum of Onkelos, Genesis I, 2; II, 7, 8 III, 15; IV, 7, 23 to 26.
2. Daniel II, 5 to 10 inclusive.

II. Parse and analyse אִתְלֵיאוּ ׀ אָצִיתָא ׀ אַפְרָא נְסִיבַת ׀ שִׁיצִי

III. Make notes on חַכִּימֵי ׀ קֶדֶם יְיָ ׀ מֵימְרָא רַבְרְבִין

IV. Give a short history of the Decipherment o. Assyrian.

V. Compare briefly the Hebrew, Aramaic, Sac Arabic and Assyrian verbs.

VI. Main features of the Rabbinic dialect.

VII. Describe the סדרים of the תלמוד and the contents of the פרקי אבות.

VIII. What is to be inferred from the inscription on the Cylinder of Cyrus?

IX. What is the probable reading of the recently found Phœnician inscription of בדעשתרת

HEBREW.

THE NEIL STEWART PRIZE.

TRANSLATION.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

Translate literally in *Exodus*:—

1. VII, 13, 14,—with notes on חזק and כבד
2. VIII, 2, 12.
3. X, 12.
4. XII, 11. Parse the dual nouns. Make a note on פסח.
5. XV, 1, 2. Account for the tense in ישיר
6. XXI, 23. Remark on that law.
7. XXV, 10 Comment on כפרת.
8. XXVI, 1.
9. XXIX, 38.
10. XXX, 18.
11. XXXIII, 14, 15. What does פנים represent here?

12. XXXIV, 35. Give the translation of the Vulgate for קרז עור and its influence on Art.
13. XXXV, 30 to 33.
14. XXXIX, 30, 31. Parse פִּתּוּחֵי.

II. Translate literally in *Isaiah* :—

1. XL, 30, 31. Parse קוי.
2. XLI, 7. Parse ימוט.
3. XLII, 18. Explain the form שמעו.
4. XLIV, 16, 17.
5. XLV, 1, with note on כורש.
6. LI, 12.
7. LII, 13, 14. Who is the עבד יהוה?
8. LV, 6. Parse בהמצאו.
9. LVI, 10. Parse צפו with the Masoretic note.
10. LVII, 14. Parse סלו.
11. LXIII, 3.
12. Translate the Masoretic note at the end of Isaiah.

HEBREW.

THE NEIL STEWART PRIZE.

GRAMMAR.

THURSDAY, APRIL 9TH, 1903:—AFTERNOON, 2 TO 5.

1. Peculiarities of the grammatical structure of the Semitic languages.
2. Give the names of the first grammarians among the Jews and among the Christians.
3. Write out a table of the accents called emperors and kings, with their respective value.

4. When does the shortening of vowels take place?
5. Comparative table of the personal pronouns in Hebrew, Aramaic, Assyrian and Arabic.
6. A comparative view of the Niphal and Hiphil perfect (first form), and Infinitive Construct of ע״ו ו פ״ו ו ע״ע and ל״ה verbs.
7. Formation of the plural, absolute and construct, in the five classes of masculine nouns.
8. Use of the article with numerals.
9. How is the apodosis of a conditional sentence introduced?
10. What are the general principles of agreement o number and gender?

MENTAL AND MORAL PHILOSOPHY

SECOND YEAR.

ELEMENTARY PSYCHOLOGY.

DECEMBER, 1902.

Answer only eight questions.

1. Define subject and object, and mention other terms used to denote the same contrast.
2. Explain how Psychology is aided by other studies.
3. Distinguish special and general senses, and mention the most prominent under each class.
4. Give some account of the muscular sense and its sensations.
5. Define the terms, presentation, representation, association, suggestion.
6. State the two primary laws of suggestion, and illustrate their operation in some simple perception.
7. Illustrate the operation of these laws in suggestion by contrast.
8. Explain the distinction between the primary and the secondary laws of suggestion.
9. Explain how the direction of thought in study illustrates the first of the secondary laws.
10. Explain the futility of the process called *cramming* for permanent mental acquisition.
11. Write a note on the psychology of habit.
12. Distinguish comparison from association, and state the three laws of thought.

SECOND YEAR.

LOGIC.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. (*a*) In what respect do the aims of Psychology and Logic differ?

(*b*) In how far, if at all, is the validity of logical principles affected by the number of persons by whom they are accepted?

2. (*a*) Is every object of experience capable of definition?

(*b*) Can there be more than one definition for the same object of thought?

3. *Either* compare (with illustrations) the use of *genus* and *species* in Logic with the use of these concepts in Botany or Zoology; *or* explain what is meant by a Natural Kind and the value of a Theory of Natural Kinds for purposes of Classification.

4. Discuss the relative values for scientific purposes of the A. E. I. O. propositions.

5. (*a*) Shew that the major premise in the second figure must be universal.

(*b*) Prove that the minor premise in the third figure must be affirmative.

(*c*) In what figures are the moods AOO, EAO, EIO and IEO valid?

6. (*a*) If (1) it is false that whenever X is found, Y is found with it, and (2) not less untrue that X is sometimes found without the accompaniment of Z; are you justified in denying that (3) whenever Z is found there also you may be sure of finding Y? And, however, this may be, can you in the same circumstances judge anything about Y in terms of Z?

(*b*) In what respect would Mill's objection to the usefulness and validity of the syllogism hold good of all inference whatever?

7. Classify and examine the following arguments:

(*a*) All that perceives is mind; the existence of objects consists in being perceived; therefore the existence of objects necessarily depends on mind.

(*b*) Every attempt to interpret the succession of mental phenomena by means of theorems originally devised to interpret the movements of matter involves materialism; the assertion of materialism involves the denial of personal immortality; the denial of personal immortality deprives morality of its principal sanction and prevents us from having any higher ideal of life than the gratification of egoistic desires; *ergo* we are justified in insinuating that philosophers who interpret mental manifestations by a reference to material structure are likely to be men of loose morals.

(*c*) Men are not brutes; brutes are irrational; all

irrational beings are irresponsible; therefore, men are not free from responsibility.

(*d*) Whatever had a beginning in time has limits in space; the universe has no beginning in time, therefore the universe has no limits in space.

(*e*) The professor did well to lay stress, not on the material triumphs of electricity which are obvious to the most superficial observer, but on the improvement in social conditions resulting from material advantages. It may be doubted whether engineering is entitled to the credit Mr. ———— was inclined to give it of up-lifting legislative aims and political ideals. We have not noticed any improvement in our legislators or aldermen since the horse-cars gave way to the trolley.

(*f*) Dr. Johnson remarked that 'a man who sold a penknife was not necessarily an ironmonger?' What is the nature of the fallacy against which the remark was directed?

8. Describe (with examples) *either* the Fallacy of the Burden of Proof: *or* the principal forms of the Fallacies of Accident.

THIRD AND FOURTH YEARS.

MORAL PHILOSOPHY.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

Answer only eight questions.

1. Give a brief sketch either of Plato's or of Aristotle's Ethics.

2. Compare the ethical theories of Clarke and of Wollaston.

3. How far does the uncertainty of speculative theories affect the certainty of the practical rules of morality?

4. In what sense may society be described as an organism?

5. Discuss the ethical aspect of Absolutism in the State.

6. What is the rational origin of real rights?

7. Explain the change in the interpretation both of obligations and of rights on advancing from the standpoint of justice to that of benevolence.

8. Discuss Aristotle's question: Can a man be unjust to himself?

9. Describe the faults of character which result from with strong will, (*b*) with weak will.

10. Illustrate the value of religious ideas for the moral life by some features in modern theories of an Agnostic type.

11. What place should emotion hold in the virtuous character?

12. Discuss the value of fasting and penance as disciplines for the moral life.

THIRD AND FOURTH YEARS.

MENTAL PHILOSOPHY.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

Answer only eight questions.

1. Explain fully what is meant by the associability and the comparability of sensations.

2. Explain those perceptions of the ear, which do not necessarily imply its musical sensibility.

3. Prove that we cannot perceive the size or shape of bodies by sight alone.

4. Explain how the distance and solidity of bodies are perceived in binocular vision.

5. What is abstraction?

6. Explain psychologically the logical rule, that a proximate genus and its differentia.

7. Write a note on the relation of thought and language.

8. How far do the arguments by which we defend our convictions represent the process by which they were originally formed?

9. Define idealization and distinguish its different forms, showing how they become united in one; *or* describe the visual arts both in their common characteristic and in their distinctive peculiarities.

10. Write a note on dreaming *or* on hypnotism.

11. Distinguish the terms *a priori* and *a posteriori* as applied to cognitions, and mention some of their equivalents.

12. Discuss the so-called antinomies in our ideas of space and time.

FOURTH YEAR.

HISTORY OF MODERN PHILOSOPHY.—

(*Paper I.*)

From the Renaissance to Kant.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

Answer seven questions.

1. Describe briefly the differences between the philosophical modes of thought of (*a*) Antiquity, (*b*) Scholasticism, and (*c*) the Modern Period.

2. *Either* explain the significance of Giordano Bruno in the history of thought, and say whether and how he is related intellectually to any later thinkers; *or* compare the Monism of Bruno with that of Spinoza.

3. Compare the scientific aims and methods of Galileo, Bacon and Descartes, expressing an opinion as to their respective values.

4. *Either* compare the general trend of Hobbes' philosophy with Descartes'; *or* explain in what respect Descartes may be regarded as the founder of modern metaphysics.

5. What were the fundamental problems left unsolved by Descartes and how did the Occasionalists and Spinoza respectively endeavour to resolve them?

6. "Substantia absolute infinita est indivisibilis." Why? And what are the difficulties resulting from this doctrine?

7. Explain what Leibnitz hoped to achieve by his doctrine of the Monads and Pre-established Harmony, and express an opinion as to how far he was successful.

8. (*a*) State your opinion regarding the significance of Locke's Essay in the history of speculation.

(*b*) How far is Locke supplemented by Hume?

FOURTH YEAR.

HISTORY OF MODERN PHILOSOPHY.—

(*Paper II.*)

From Kant to about the year 1860.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

Answer seven questions.

1. In what respect does Kant belong to the Age of

Reason and Enlightenment.

2. (*a*) Describe carefully the differences between the aim and method of the Critical Philosophy and those of Ontology and Empiricism.

(*b*) Does Criticism give any support to Scepticism?

3. Explain the relation of Ethics to Religion in the Kantian Philosophy.

4. Explain the aim of Fichte in the "Wissenschaftslehre."

5. Explain the aim and significance of the Hegelian Dialectic and express an opinion as to how far Hegel has made an advance on the Kantian position.

6. Discuss the question whether there is any similarity in the attempts of Hegel and Comte to formulate a general law of intellectual and social development, and add any critical remarks (you may consider desirable) on such general historical constructions.

7. Give a short account of *either* Schleiermacher's *or* Herbart's position in the History of Philosophy.

8. *Either* state and justify your opinion of the value of Schopenhauer's Theory of Knowledge, *or* discuss the opposed views of Hegel and Schopenhauer regarding the meaning and value of history.

SECOND YEAR.

LOGIC AND PSYCHOLOGY (ADVANCED SECTION).

ELEMENTARY INTRODUCTION TO PHILOSOPHY.

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 12.

(*Answer four questions in A and four in B.*)

A.

1. How would you distinguish Philosophy from Science? Give and explain one or more definitions of Philosophy.

2. What general tendency of thought leads to the philosophical theory of Monism? Illustrate this tendency in simpler processes of reflection.

3. What was the Socratic conception of definition? Give examples from any of Plato's Socratic dialogues.

4. Show by reference to logical processes that it is the nature of thought; (1) To assert or refer to reality; (2) To demand a Reason.

5. Briefly explain (1) Generalisation;
(2) Inductive Inference.

6. What is meant by "Practical Philosophy," and what branches does it include?

B.

1. For what ideas is Modern Psychology mainly indebted to Berkeley?

2. How does Berkeley treat the idea of cause? Give his view of Laws of Nature.

3. Show how Philonous meets the main objections urged against Idealism.

4. How does Berkeley explain the perception of Distance? Has any addition been made to his argument by modern experiment?

5. Of what realities does the world consist according to Berkeley? Does he make good his contention, "I only reject the philosophic sense of the word Substance."

6. Make any remarks of your own on the Dialogues.

SECOND YEAR.

LOGIC AND PSYCHOLOGY (ADVANCED SECTION).

GENERAL PSYCHOLOGY AND THE ELEMENTS OF PSYCHOPHYSICS.

TUESDAY, APRIL 21ST, 1903:—MORNING, 9 TO 12.

1. What is the meaning of the distinction between subject and object?

2. Describe the methods of Psychology.

3. *Either* give a careful account of the characteristics of consciousness, *or* state what is meant by the "Mind-Dust" Theory and point out the objections to which it is exposed.

4. State and examine the arguments for the existence of unconscious mental states, and show how this hypothesis is connected with the hypothesis of a Soul-Substance.

5. Give a summary of the arguments for and against Parallelism and explain the interpretation of Parallelism put forward in the lectures.

6. *Either* explain Weber's law and discuss Fechner's interpretation of it, *or* describe the various psychophysical methods and explain how, when the discriminative sensibility is small, the least discernible difference is large.

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

PLATO AND ARISTOTLE.

TUESDAY, APRIL 21ST, 1903:—MORNING, 9 TO 12.

(*Answer seven questions.*)

1. What is the modern view of the Order of Plato's dialogues, and on what grounds is it based?

2. What place is given to Dialectic in Plato's system? Trace the origin of the conception.

3. Explain in detail the Analogy in the Republic between the Individual and the State, and show how it determines the treatment of the State.

4. Comment on the following:
   (*a*) "The Noble Lie."
   (*b*) "Justice the Health of the State."
   (*c*) "Justice the Interest of the Stronger."
   (*d*) "Theory of Reminiscence."

5. What influences can be traced on the philosophy of Plato and of Aristotle from the circumstances of their lives and conditions of their age?

6. In what sense is Aristotle the originator of Scientific Method?

7. Explain Aristotle's conceptions of
   (*a*) Nature;
   (*b*) The Four Causes;
   (*c*) The Potential and the Actual (δυναμ – ιξένεργεια)

8. Contrast the treatment of Practical Philosophy by

Aristotle with that more usually adopted in Modern times.

9. How does Aristotle treat the following subjects:
(*a*) The institution of Private Property;
(*b*) The origin of the State;
(*c*) Slavery; (*d*) Money.

10. Write a short essay either on Plato's Theory of Education or on The main Elements of Aristotle's Political Theory.

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

EPISTEMOLOGY (HISTORICAL).

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

(*Answer question 10 and 5 others, or 7 questions not including 10.*)

1. Fully discuss the treatment of the doctrines, (*a*) Knowledge is Sensible Perception, and (*b*) All is Flux, in the Theætetus.

2. What germs of later thought may be found in the Theætetus?

3. Show how Plato's Theory of Ideas was intended to reconcile previous opposing doctrines. Give the main points of the Criticisms directed against the Ideal Theory, in the Parmenides.

4. Explain Aristotle's view of the Relation between the Universal, and the Individual.

5. What do you understand by the following statements of Aristotle?

(1) In a certain sense knowledge is the things known, perception the things perceived.

(2) Prior in the order of our knowledge are the things nearest the senses, prior in the order of nature are the things farthest from the senses.

6. What has been the significance of "Categories" in philosophy?

7. Give Reid's doctrine of the "original principles of human nature," showing its relation to views of Hume on the one hand, and of Kant on the other.

8. Illustrate Seth's statement, "In English philosophy, we can trace the evolution and Self-Refutation of the Two-Substance doctrine, and the Complementary Theory of Representative Perception."

9. Explain the Kantian or Critical view of Experience.

10. Write a short Essay on the Relativity of Knowledge taking as text, Protagoras' dictum "Man is the Measure of all things."

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

EPISTEMOLOGY (GENERAL.)

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

(*Answer six questions.*)

1. Examine the relations of Psychology to Epistemology, with special reference to Psycho-Physics.

2. What Metaphysical view does the study of Epistemology tend to produce? Indicate the course of reasoning involved?

3. Discuss the following statements:—

(*a*) All Universal Judgments are hypothetical;

(*b*) Our waking thought is one continuous judgment;

(*c*) Increase of Thought is Increase of Reality.

4. State the general law of Inference and give some of the main types. Show that they cannot all be reduced to syllogistic form.

5. Explain and illustrate the Unity of Thought, through the processes of Concept, Judgment, and Inference.

6. Point out all the bearings of Bosanquet's account of the three characteristics of judgment, as, Necessary, Universal, Constructive.

7. Criticise the ordinary logical treatment of Induction, from the stand-point of Epistemology.

8. Consider the distinction between the *a priori* and the Empirical Elements and Methods in Knowledge, and their relation to each other. Make some reference to Lotze's views.

9. Indicate the various considerations which give rise to philosophical scepticism.

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

LOCKE, BERKELEY AND HUME.—(*First Paper.*)

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

(*Answer seven questions.*)

1. State Locke's arguments against innate ideas and principles and point out the sense in which they may be considered valid.

2. Discuss the place of Reflection in Locke's Essay, supporting your interpretation by reference to definite passages.

3. (*a*) Is the distinction between the primary and secondary qualities an original feature of Locke's Theory of Knowledge?

(*b*) Is it liable to any fundamental objection?

(*c*) Would Berkeley's *dictum*, "an idea can be like nothing but an idea," present a difficulty for it?

4. State Locke's doctrine regarding the conception of the Infinite and show how he applies it in the discussion of the concept of Space.

5. Summarize as concisely as possible the result of Locke's investigation of the concept of Substance, pointing out at the same time how it illustrates the limitations of the method of the Essay.

6. Describe with critical comments *either* Locke's views on the degrees of knowledge *or* on the reality of knowledge.

7. *Either* explain how sensation is both a positive and negative limit of knowledge *or* discuss the statement: "motion is able to produce nothing but motion."

8. Discuss the doctrine that Moral Science is capable of being treated demonstratively.

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

LOCKE, BERKELEY AND HUME.—(*Second Paper.*)

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

(*Answer questions 1, 2, and four others.*)

1. Compare the positions of Locke, Berkeley and Hume regarding (*a*) the origin of ideas, (*b*) the concept of substance.

2. State carefully the main contentions of Berkeley's Idealism and examine it with reference to its premises and consequences.

3. What is the value of Hume's fundamental proposition considered as a criterion of truth?

4. Explain the foundation of Hume's distinction between Relations of Ideas and Matters of Fact. Is there anything corresponding to it in Locke's Classification of Knowledge?

5. "If we reason *a priori* anything may appear able to produce anything." Point out the ground and discuss the correctness of this view.

6. (*a*) With what effect does Hume apply his concept of causation in the discussion of the Problem of the Freedom of the Will?

(*b*) With what result is the Principle of Causation applied in the discussion of the question of miracles?

7. How is Hume's Scepticism to be interpreted?

8. "Philosophical decisions are nothing but the reflections of common life methodized and corrected." Give your reasons *either* for assenting to *or* dissenting from this view.

THIRD YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

GREEK PHILOSOPHY.

FRIDAY, APRIL 3RD, 1903:—MORNING, 9 TO 12.

1. Describe the condition of the Greek colonies in which philosophy originated.
2. Give a brief outline of the Pythagorean philosophy *or* of the arguments of Zeno the Eleatic.
3. Compare the doctrines of Empedokles, Anaxagoras and Demokritos with regard to the elementary substance of things.
4. Give an account of the Sophists, both on their favourable and on their unfavourable side.
5. Tell the leading facts in the life of Sokrates, and describe his peculiar method of teaching.
6. Explain the modifications which the Cyrenaic doctrines received from Annikeris, Hegesias and Theodoros respectively.
7. Sketch the Ethics *either* of the Stoics *or* of the Epicureans.
8. Give a brief account *either* of the Pyrrhonists *or* of the New Academy.

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

THE PHILOSOPHY OF KANT.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.30.

(*Answer nine questions.*)

1. Give a brief account of the relation of Kant to his predecessors.
2. "The Critique of Pure Reason is not a Critique of books or systems." Explain this and state carefully the aim of the Critical Philosophy.

3. Explain the "Idealism" of Kant, showing that the "transcendental ideality of space and time involves the reality of things."

4. State and discuss the arguments for the *a priori* intuitive character of space.

5. Explain *either* the meaning and value of the "synthetic unity of apperception," *or* the deduction of the categories.

6. (*a*) What is the significance of the synthetic propositions *a priori* of experience?

(*b*) Discuss the proof for the Principle of Persistence.

7. Examine the objection that the introduction of the thing-in-itself into Kant's Theory of Knowledge involves an illicit application of the Principle of Causation.

8. Explain the importance of Kant's criticism of Rational Psychology and point out how Kant here approaches to a monistic interpretation of the relation between the Physical and the Psychical.

9. *Either* comment on the utterance: "I had to remove knowledge in order to make place for faith"; *or* express an opinion as to how far the results of Kant's theoretical and practical philosophy are mutually compatible.

10. What is Kant's conception of the value of Teleology in Philosophy and Science? Does modern Biology give support to or conflict with Kant's interpretation?

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

PRINCIPLES AND METHODS OF ETHICS.—(*First Paper.*)

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

(*Answer six questions.*)

1. Compare the treatment of the Will in the Ethics of Aristotle, and of Green. What is Sidgwick's view?

2. "The Ethical Systems of Ancient Philosophy are

all alike intellectualistic." Examine this statement in reference to the Ethics of Aristotle generally, and to the treatment of φρόνησις (Practical Reason) especially.

3. Discuss the relations between Ethics and Politics in connections with the following:—

(*a*) "If the end be the same for the individual, and for the State; greater and more complete will be that of the State." Aristotle.

(*b*) "It would be too paradoxical to say that the whole duty of man is summed up in the effort to attain a right state of social relations." Sidgwick.

4. What hints of the Method he follows are given by Aristotle? Examine his treatment,

(*a*) of common opinion;

(*b*) of the Philosophic views of other thinkers.

5. Comment on the following:—

(*a*) The Doctrine of the Mean;

(*b*) The Practical Syllogism;

(*c*) Equity (ἐπιείκεια).

(*d*) High mindedness (μεγαλοψυχία).

6. What elements of Social and of Ethical Value may be found in Aristotle's treatment of friendship?

7. Analyse Aristotle's treatment of the good (τὸ ἀγαθον) with some reference to Greek thought.

What is the modern attitude towards this conception?

8. Do you consider Aristotle's Ethics a philosophical treatise? In which portions is the philosophical spirit most marked?

9. Mention the chief features distinguishing the books books of Eudemus from those of Aristotle? Illustrate, from the treatment of one or more than one subject.

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

PRINCIPLES AND METHODS OF ETHICS.—(*Second Paper.*)

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

(*Answer six questions.*)

1. Suggest some comprehensive classification of Ethical Systems. Define the theories brought under it.
2. Consider the practical value of Ethical Theory in general, and of any one type of Ethical Theory.
3. Estimate the value of Green's view of the development of the moral ideal, through history.
4. Why does Green begin his Ethics with a Metaphysic of knowledge? Compare the view leading to this method, with Sidgwick's conception of Ethical Method.
5. What are the chief difficulties attaching to Green's doctrine of the Spiritual Principle in Nature and Life?
6. Give some account of Sidgwick's treatment of Utilitarianism. Are the criticisms of Green valid against the theory, in this form?
7. "The Christian Ideal is self-denial.
"The Greek Ideal is Self-preservation.
"The Christian Ideal is Negation of the World.
"The Greek Ideal is Affirmation of the World."
Paulsen.
How would Green deal with these oppositions?
8. What does Green signify by,
(*a*) The Personal Character of the Moral ideal;
(*b*) Reason as source of the idea of Common Good?
9. Write a short essay on any question which seems to you of fundamental interest in Ethics.

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

SCHOPENHAUER'S PRINCIPLE OF SUFFICIENT REASON AND WORLD AS WILL AND IDEA.

TUESDAY, APRIL 21ST, 1903:—MORNING, 9 TO 12.

(*Answer seven questions; the last to be attempted by all.*)

1. How comes it according to Schopenhauer that the Principle of Sufficient Reason has a fourfold root? Comment on this view.

2. Compare the use of the following terms by Schopenhauer and Kant respectively: *objective, a priori, phenomenon, idea.* In answering, make reference to corresponding doctrines of these thinkers.

3. State and discuss the nature and value of Schopenhauer's proof of the Principle of Causation.

4. Examine the procedure by which Schopenhauer reaches the fundamental proposition of his Metaphysic.

5. Point out the difficulty of reconciling the fundamental proposition of Schopenhauer's Theory of Knowledge with the fundamental proposition of the Metaphysic.

6. Compare briefly the Idealism of Berkeley and Schopenhauer.

7. (*a*) What does Schopenhauer mean by the Platonic Idea in Art?

(*b*) Why does salvation consist in aesthetic contemplation?

8. Explain the origin of Schopenhauer's Pessimism and express an opinion as to its ethical value.

9. Express an opinion on "sympathy as the foundation of ethics."

10. (*a*) Is Denial of the Will logically possible?

(*b*) Can there be any Freedom of the Will.

(*c*) Is Schopenhauer's argument against suicide valid?

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

WATSON'S OUTLINE OF PHILOSOPHY, AND KULPE'S INTRODUCTION TO PHILOSOPHY.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

(*Answer six questions.*)

1. Examine the principal views which have been held as to the problem of philosophy, including that of Comte.

2. Mention and discuss some of the questions raised for philosophy by theories of Natural Evolution.

3. Summarise and criticise Watson's account of Spencer's philosophy of Mind.

4. Discuss the respective claims of Dualism and of Monism to our acceptance.

5. Criticise Mill's views regarding the Axioms of Mathematics and the Laws of Nature.

6. Examine the following statements:—

(*a*) Dogmatism is most generally found in connection with rationalism.

(*b*) Dogmatism sets no limits to knowledge; Scepticism sets no limits to ignorance. Kulpe.

7. Give some account, with criticism, of.

(*a*) Kant's Philosophy of Rights;

(*b*) Kant's Philosophy of Art as presented by Watson.

8. What do you understand by the following:

(*a*) Relativity of Knowledge;

(*b*) Speculative Idealism?

9. Give a full account of the sphere, either of Epistemology, or of Psychology.

FOURTH YEAR.

MENTAL AND MORAL PHILOSOPHY (HONOURS).

SPINOZA'S ETHICS.

FRIDAY, APRIL 3RD, 1903:—MORNING, 9 TO 12.

1. Give Spinoza's definition of Substantia, Attributum, and Modus.

2. How does Spinoza identify Substance with God; and what view does he take of individual things generally, of individual minds and bodies in particular?

3. Wherein does the Occasionalism of Spinoza approach, at times, that of modern Agnostics, at other times, that of the old religious Occasionalists?

4. Wherein does Spinoza's Psychology show a tendency to Sensationalism; wherein, an opposite tendency? Explain particularly, in this connection, his distination between "tria cognitionis genera."

5. Explain Spinoza's doctrine of causality, and his distinction between adequate and inadequate causes, between action and passion.

6. Define Affectus, and distinguish the affectus primitivos.

7. Explain the definition of Perfection and its identification with Reality.

8. Explain the relation of action, virtue, the third kind of knowledge, and the intellectual love of God.

MATHEMATICS AND NATURAL PHILOSOPHY

FIRST YEAR.

GEOMETRY—ARITHMETIC.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

A.

1. Explain the meaning of the words "similarly situated" in Prop. 18, Bk. VI, by reference to the problem. "On a right line whose length is 6 construct a triangle similar and similarly situated to a triangle whose sides are 3, 4 and 5 respectively."

2. From a point B tangents are drawn to a circle, touching it at the points A and D; B, A and D are joined to the centre C; prove that

1°. The tangents are equal.

2°. If A be joined to D, cutting $B\,C$ in E, the triangles $C\,A\,E$ and $B\,C\,A$ are similar.

3°. The area of the rectangle contained by $B\,C$ and $C\,E$ is always the same, wherever the point may be, from which the tangents are drawn.

3. Show how to construct on a given straight line a rectangle equal to a given square, stating the enunciations of the propositions in the First Book that are needed.

4. If the mud in the streets be on the average 2 inches deep, find in cubic metres the volume of mud on 80 miles of streets, the average width of the street being assumed to be 30 feet.

B.

5. If the exterior vertical angle of a triangle be bisected by a straight line which also cuts the base, the base shall be divided externally into segments which have the same ratio as the sides of the triangle.

6. Show that the lengths of the sides of an equilateral triangle, square, and regular hexagon inscribed in a circle are proportional to

$$\sqrt{3},\ \sqrt{2},\ \sqrt{1}$$

7. Find the locus of points from which the tangents to two given intersecting circles are equal.

8. Which is the most productive investment, bank stock paying 10 p.c. at 234½ or 3 p.c. bonds at 92½?

C.

9. Similar triangles are to one another in the duplicate ratio of their homologous sides.

10. The sides of a triangle are 14, 15 and 16. Find the length of the bisector, from vertex to base, of the angle between the sides, whose lengths are 14 and 16.

11. Inscribe in a given circle a triangle equiangular to a given triangle.

12. If 5 men and 9 boys could do a piece of work in 17 days, how long would it take 9 men and 12 boys to do it, the work of 2 men being equal to that of 3 boys.

FIRST YEAR.

TRIGONOMETRY—ALGEBRA.

WEDNESDAY, APRIL 15TH, 1903:—AFTERNOON, 2 TO 5.

A.

1. Find the three angles and the area of the triangle whose sides are 3, 4 and 5 respectively.

2. Prove

$$\sin A + \sin B = 2 \sin \tfrac{1}{2}(A + B) \cos \tfrac{1}{2}(A - B)$$

$$\sin 3A = 3 \sin A - 4 \sin^3 A.$$

3. Find the first hour after 6 o'clock at which the two hands of a watch are at right angles to each other.

4. Prove that if

$$\frac{a}{b} = \frac{c}{d} = \frac{e}{f},$$

then

$$\frac{a}{b} = \frac{ma + nc + pe}{mb + nd + pf}.$$

B.

5. Prove the following relations:—

(*a*) $\tan(A+B) = \dfrac{\tan A + \tan B}{1 - \tan A \tan B}$.

(*b*) $\dfrac{\tan^2 x - \tan^2 y}{1 - \tan^2 x \tan^2 y} = \tan(x+y)\tan(x-y)$

(*c*) $\dfrac{\cos 27^\circ - \sin 27^\circ}{\cos 27^\circ + \sin 27^\circ} = \tan 18^\circ$

6. Prove that in any triangle:—

(*a*) $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

(*b*) $\cos \dfrac{A}{2} = \sqrt{\dfrac{s\,(s-a)}{bc}}$

(*c*) $\dfrac{a+b}{c} = \dfrac{\cos \frac{A-B}{2}}{\cos \frac{A+B}{2}}$

7. In a triangle given
$a = 445$, $b = 83$, $C = 87^\circ.55'$, find A and B.

8. A line AB length 400 yards is measured close by the side of a river, and a point C close to the bank on the other side is observed from A and B. The angle CAB is $50^\circ.40'$ and CBA $60^\circ.30'$. Find the perpendicular breadth of the river.

C.

9. (*a*) The sum of the first ten terms of an G. P. equals 244 times the sum of the first five terms. Find the ratio of the fourth to the sixth term.

(*b*) Insert four harmonic means between 1 and 2.

10. (*a*) If $a : b = c : d$
prove $a^2 + c^2 : ab + cd = ab + cd : b^2 + d^2$.

(*b*) y varies as the sum of two quantities of which the first is constant and the second varies as x. If $y = 0$ when $x = 1$, and $y = 1$ when $x = 2$ find y when $x = 3$.

11. Simplify (*a*) $\frac{3^{n+1} - 6 \times 3^{n-1}}{10 \times 3^{n-2} - 3^n \div 27}$

(*b*) Find the square root of $10 - 2\sqrt{21}$.

12. (*a*) Given log 2 = .30103, log 3 = .47712, log 10 = 1.84510 and log 1262 = 3.101059 find $\sqrt[20]{105}$.

(*b*) Show how to transfer logarithms from one base to another.

SECOND YEAR.

SPHERICAL TRIGONOMETRY—ALGEBRA.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

A.

1. The sides of a spherical triangle are

$a = 70° \ 14' \ 20''$
$b = 49° \ 24' \ 10''$
$c = 38° \ 46' \ 10''$

find the angle B.

2. Prove that the inclination of the ecliptic to the equator (two great circles on the celestial sphere) is equal to the angle subtended at the centre of the sphere by the arc joining the poles of the ecliptic and equator.

3. Expand $\frac{2 + x^2}{1 + x - x^2}$ in a series of ascending powers of x as far as x^5 by the methoc of Indeterminate Coefficients.

4. 13 persons take their places at a round table, show that the chances against two particular persons sitting together are 5 to 1.

B.

5. Prove that in any spherical triangle

(*a*) $\sin A = \frac{2\sqrt{\sin s \sin (s-a) \sin (s-b) \sin (s-c)}}{\sin b \sin c}$

(*b*) $$\frac{\tan \frac{A+B}{2}}{} = \frac{\cos \frac{a-b}{2}}{\cos \frac{a+b}{2}} \cot \frac{C}{2}$$

6. In a right angled spherical triangle (the right angle at C) prove

(*a*) $\cos c = \cos a \cos b$.

(*b*) $\sin A = \dfrac{\sin a}{\sin c}$

(*c*) $\cos A = \dfrac{\tan b}{\tan c}$

7. State Napier's rule for the solution of right angled triangles and solve the right angled triangle, $a = 40° 20'$, $b = 30° 30'$.

8. The sides and angles of the polar triangle are the supplements respectively of the angles and sides of the primitive triangle.

C.

9. (*a*) If ${}^{10}C_r = {}^{20}C_{r-10}$ find ${}_rC_{12}$.

(*b*) Find the number of permutations that can be made by using all the letters of the word Kennebecasis.

10. (*a*) Find the coefficient of x in the expansion of

$$\left(x^2 - \frac{a}{2x}\right)^{14}.$$

(*b*) A man has a capital of $100,000 for which he receives interest at 3½ p.c.; if he spends $7,000 per annum out of his money, find in what year he will have lost all his capital, given log 2 = .301, log 3 = .477, log 23 = 1.362.

11. Without solving test the nature as to reality and rationality of the roots of the following equations:

(1) $7x^2 - 13x + 6 = 0$.

(2) $7x^2 - 13x + 7 = 0$.

(3) $7x^2 - 13x - 7 = 0$.

(4) $(a + b + c)x^2 - 2(a + b)x + (a + b - c) = 0$.

12. (*a*) Solve the equation $\begin{vmatrix} a+x, & 1, & 2 \\ 1, & b+x, & 2 \\ 1, & 1, & 2 \end{vmatrix} = 0$.

(*b*) Show that the value of a three-row determinant is zero if two rows are identical.

SECOND YEAR.

SOLID GEOMETRY—CONICS—DYNAMICS.

THURSDAY, APRIL 16TH, 1903:—AFTERNOON, 2 TO 5.

A.

1. If a straight line be perpendicular to each of two intersecting straight lines at their point of intersection it will be perpendicular to the plane which contains them.

2. Define the angle between two planes.

3. In the parabola the square of the ordinate at any point is equal to the rectangle contained by the abscissa and the latus rectum.

4. In the parabola the tangent at any point P bisects the angle between the focal distance of P, and the perpendicular from P on the directrix.

B.

5. If two straight lines are parallel and one of them is perpendicular to a plane, the other will be also perpendicular to that plane.

6. The sum of the face angles of any convex polyhedral angle is less than four right angles.

7. Tangents to a parabola from any point subtend equal angles at the focus and have equal projection on the Directrix.

8. If two chords of a parabola PP_1, and QQ_1 intersect in O, $PO.OP_1 : QO.OQ_1$ in the ratio of the parameters of the diameters which bisect the chords.

C.

9. A shot is fired from a gun on the top of a cliff 400 feet high, with a velocity of 768 feet per second at an elevation of 30°. Show that the horizontal distance, from the vertical through the gun, of the point where the shot strikes the water at the foot of the cliff is $3200\sqrt{3}$ yards.

10. A ball of mass 2 lbs. impinges directly on a ball of mass 1 lb. which is at rest; shew that if the velocity with which the larger ball impinges be equal to the velocity of the smaller ball after impact, then the coefficient of restitution is ½.

Describe and explain an experimental arrangement for determining the coefficient of restitution of ivory.

11. A body describes a circle of radius r with uniform velocity v. Shew that the acceleration to the centre is $\frac{v^2}{r}$.

The sails of a windmill are 29 feet long and it revolves once in 6 seconds. Shew that a man caught up and carried round on the end of a sail might let go for a short time at the top, and then catch hold again without falling.

12. Explain how the time of oscillation of a pendulum or other suspended system may be determined with great accuracy *either* by the method of coincidences, *or* by use of a telescope and scale, as in the case of Maxwell's Needle.

A cylinder with horizontal cross-arm is suspended by a vertical wire, and the time of oscillation found to be 6.84 seconds. Two equal weights, each of 84.2 gms, are attached to the ends of the cross-arm, the distance of the weights from the wire being 12.7 cms. The time of oscillation is now found to be 8.76 seconds. Find the moment of inertia of the system without the weights.

THIRD AND FOURTH YEARS.

ASTRONOMY—OPTICS.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

A.

1. In what manner is the presence of new heavenly bodies detected by means of photography.

2. Name the astronomical instruments and state the observations required in order to ascertain the positions of the stars so as to form a celestial globe,

(*a*) In the Nautical Almanac the "Apparent places of the Stars" are given for every tenth day. How do you account for this when these stars are also called "Fixed Stars."

3. Describe the method by which the longitude of McGill College observatory has been ascertained.

4. Describe any one method for finding the latitude of a place.

5. Assuming that the diameter of the Sun is 100 times the diameter of the Earth, and that the distance of the Sun from the Earth is 92¼ millions of miles, find the length of the Earth's shadow. How does this question enter into the consideration of eclipses?

6. Describe the method of finding the diameter of the Earth.

B.

7. Describe the Sextant and explain the optical principle upon which it depends.

8. State the Laws of Refraction, and find a formula for the focus of a pencil of rays after refraction through a lens.

9. A convex lens of crown glass (index of refraction 1.5) has surfaces of radius 10 and 15 inches respectively. Calculate its focal length.

10. The lens of question 9 is to be achromatized by a lens of flint glass (refractive index 1.58), one of whose surfaces is to fit the 10-inch surface of the crown glass lens. What must be the radius of the other surface?

11. A short-sighted person sees most distinctly at a distance of 5.4 inches. What should be the nature and focal length of his spectacles?

12. Describe the Astronomical Telescope, and find an expression for the field of view by whole pencils.

The focal lengths of the objective and the eyepiece of a telescope are 3 feet and ¼ inch respectively. It is adjusted by a long-sighted person who sees most distinctly at a distance of 2 feet so as to view a meter scale distant 24 feet from the objective. Find the distance of the eyepiece from the objective and the magnification.

THIRD AND FOURTH YEARS.

MECHANICS AND HYDROSTATICS.

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 5.

1. Show how to find the resultant of any number of forces in one plane acting upon a particle.

Forces of 2, 3, 4, 5 and 6 lbs. weight act at one of the angular points of a regular hexagon towards the other five points; find the direction and magnitude of their resultant.

2. State and prove Lami's Theorem.

A heavy uniform beam of weight W rests with its extremities on two smooth inclined planes, which meet in a horizontal line, and whose inclinations to the horizon are α and β; find its inclination to the horizon in the position of equilibrium, and the reactions at the planes.

3. Find the centre of gravity of a plane triangle.

Particles of 1, 2, 3 and 4 lbs. weight are placed at the angular points of a square of side 10 inches. Find the distance of their centre of gravity from the centre of the square.

4. State and prove in any manner the Principle of the Inclined Plane.

A body of weight 4 lbs. rests in limiting equilibrium on a rough plane whose slope is 30°; the plane being raised to a slope of 60°, find the force along the plane required to support the body.

5. Prove the formulae, $s = \frac{a t^2}{2}$ and $\frac{v^2}{2} = a s$ for a body under uniform acceleration.

After a body has been falling for 5 seconds it passes through a pane of glass and loses half its velocity; if it now reach the ground in 1 second, find the height of the glass above the ground.

6. State the Second Law of Motion and explain how the unit of force must be chosen in order that it may be expressed by the formula $a = \frac{P}{M}$.

A string hung over a pulley has at one end a weight of 10 lbs., and at the other weights of 8 and 4 lbs.; after being in motion for 5 seconds the 4 lb. weight is taken off; find how much further the weights go before they first come to rest.

7. On the moon gravity has about one-sixth of its value at the surface of the earth. Find the maximum

range of a lunar gun which could project a shot with a velocity of 1600 feet per second.

8. A train of 150 tons, moving at 50 miles an hour, has its steam shut off and the brakes applied, and is stopped in 363 yards. Supposing the resistance to its motion to be uniform, find its value, and find also the mechanical work done by it measured in foot-pounds.

9. Describe and explain the use of Nicholson's Hydrometer.

When a certain solid is placed in the upper cup, it is found that 18 grains are required to sink the instrument to the mark; when it is in the lower cup, 23 grains are required, and when it is taken away altogether, 33 grains are required. Find the specific gravity of the solid.

10. A mixture is made of two substances in the proportion of 2 to 1, first by volumes, and next by weights. The specific gravity of the mixture is in the first case 1.3, and in the second $1\frac{5}{22}$. Find the specific gravity of the substances.

11. At the sea-level the barometer stands at 760 mm., and the temperature is 18°C., while at the top of a mountain the barometer stands at 400 mm. and the temperature is 3°C. Compare the weights of a cubic metre of air at the two places.

12. A cylindrical diving bell, 10 feet high and 6 feet in diameter, is sunk till its top is 59 feet below the surface of water. If the water barometer stands at 34 feet, how many cubic feet of air at ordinary pressure must be pumped into the bell to prevent the water from rising more than one foot within it?

FIRST YEAR.

MATHEMATICS—(*Advanced Section*).

GEOMETRY—(*First Paper*).

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 12.

A.

1. The middle points of the three diagonals of a complete quadrilateral are collinear.

2. Divide a line into two parts such that the difference of their squares shall be equal to the square of a given line.

3. Given the base of a triangle, the vertical angle, and the rectangle under its sides, construct the triangle.

4. If the base AB of a triangle ACB be divided in D so that $2\ AD = 3\ DB$, prove that

$$2\ AC^2 + 3\ BC^2 = 2\ AD^2 + 3\ BD^2 + 5\ CD^2.$$

5. Describe a circle having its centre at a given point, and cutting a given circle orthogonally.

6. A point inside a triangle is joined to the vertices, and the lines thus drawn are produced to cut the sides; prove that the ratio of the segments of any side is the same as the ratio compounded of the ratios of the segments of the other two sides.

B.

7. In a given line find a point such that the sum of its distances from two fixed points shall be a minimum.

8. Three times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the lines bisecting the sides of the triangle.

9. Through one of the points of intersection of two given circles draw a line, the sum of whose segments intercepted by the circles shall be a maximum.

10. The locus of the intersection of tangents to a circle at the extremities of a chord which passes through a fixed point, is the polar of the point.

11. The Arithmetic mean is to the Geometric mean as the Geometric mean is to the Harmonic.

12. State and prove Pascal's Theorem.

FIRST YEAR.

MATHEMATICS—(*Advanced Section*).

GEOMETRY—(*Second Paper*).

WEDNESDAY, APRIL 22ND, 1903:—AFTERNOON, 2 TO 5.

A.

1. Reciprocate the theorem:—

If two vertices of a triangle move on fixed lines, while the three sides pass through three collinear points, the locus of the third vertex is a right line.

2. Given the base and ratio of the sides of a triangle, find the locus of the vertex.

3. Given the first, third and fourth rays of a pencil, and its anharmonic ratio, construct the pencil.

4. If two triangles have lines joining corresponding vertices concurrent, the intersections of corresponding sides are collinear.

5. The direct common tangent of two circles passes through their external centre of similitude.

6. If from every point in a given line tangents be drawn to a given circle, the chords of contact passes through the pole of the given line.

B.

7. Any two circles can be inverted into themselves.

8. Any line cutting a circle, and passing through a fixed point, is cut harmonically by the circle, the point and the polar of the point.

9. If the three sides of a triangle be cut by any transversal, prove that the ratio of the segments of the side which is cut externally is equal to the ratio compounded of the ratios of the segments of the other two sides.

10. The feet of the three perpendiculars let fall on the sides of a triangle from any point in the circumference of the circumscribed circle, are collinear.

11. In equiangular triangles the rectangles under the non-corresponding sides about equal angles are equal to one another.

12. Through a given point draw a line which shall form with two given lines a triangle of minimum area.

FIRST YEAR.

MATHEMATICS—(*Advanced Section*).

THEORY OF EQUATIONS—ALGEBRA.

THURSDAY, APRIL 23RD, 1903:—MORNING, 9 TO 12.

A.

1. Trace

$$2x^3 - 15x^2 + 24x + 25$$

laying down ten points and note the greatest and least values of the polynomial.

2. Show that

$$f(x+h) = f(x) + f_1(x)\,h + f_2(x)\frac{h^2}{1.\ 2} + \&c$$

(*a*) Apply this to the polynomial in question 1 when x becomes $x + b$.

3. Solve the equation

$$3x^3 - 4x^2 + x + 88 = 0$$

one root being $2 + \sqrt{-7}$.

4. Expand $(1 - x)^{-\frac{1}{2}}$ to 5 terms.

5. Find the sum to n terms of

$$1^3 + 3^3 + 5^3 + 7^3 + \text{etc}$$

6. Resolve $\dfrac{Ax + B}{(x-a)(x-b)(x-c)}$ into partial fractions.

B.

7. If the expression $\alpha + \beta\sqrt{-1}$ be a root of the equation $f'(x) = 0$, then $\alpha - \beta\sqrt{-1}$ is also a root.

Solve the equation $x^4 + 2x^3 - 5x^2 + 6x + 2 = 0$, one root being $-2 + \sqrt{3}$.

8. Every equation of an even degree whose last term is negative, has at least two real roots, one positive and the other negative.

9. Between two consecutive real roots, a and b of the equation $f(x) = 0$ there lies at least one real root of the equation $f^1(x) = 0$.

10. By means of Sturm's theorem find the number and situation of the real roots of the equation

$$x^3 - 7x + 7 = 0.$$

11. Prove $a^x = 1 + x\,\text{Log}_2\,a + \dfrac{x^2}{\lfloor 2}(\text{Log}_2\,a)^2 + \text{etc}$

12. Prove that the number of combinations of n things r at a time is

$$\frac{\lfloor n}{\lfloor r\ \lfloor n-r}$$

If the number of combinations of n things $r - 1$ at a time is the same as the number $r + 1$ at a time, find n.

SECOND YEAR—(*Advanced Section*).

ANALYTIC GEOMETRY—(*First Paper*).

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

A.

1. Find h so that the following equation may represent right lines:—

$$x^2 + 2hxy + y^2 - 5x - 7y + 6 = 0.$$

2. Given 4 points, A, B, C, D, find the locus of a point P such that

$$PA^2 + 2PB^2 + 3PC^2 + 4PD^2 = \text{Constant}.$$

3. Find the equation of the circle through the origin and the points (2, 3), (3, 4).

4. Find the most general form of the equation of a circle in polar co-ordinates.

5. Given the vertical angle and area of a triangle, find the locus of the point where the base is cut in a given ratio.

6. Find by transformation the equation in polar co-ordinates of the line

$$x \cos a + y \sin a = p.$$

B.

7. Shew that the lines $Ax + By + C = 0$, $A_1x + B_1y + C_1 = 0$ are perpendicular to one another when $AA_1 + BB_1 = 0$.

8. Given three fixed lines OA, OB, OC, meeting in a point, if the three vertices of a triangle move one on each of these lines and two sides of the triangle pass through fixed points, prove that the remaining side passes through a fixed point.

9. (*a*) Find the distance from the intersection of the lines $3x + 2y + 4 = 0$, $2x + 5y + 8 = 0$, to the line $y = 5x + 6$.

(*b*) Find the area of the quadrilateral whose vertices are (0,0), (0,5), (11,9), (7,0).

10. Find the equation of the tangent to the circle $(x - a)^2 + (y - b)^2 = r^2$ at the point x_1 y_1.

11. Find the equation of a straight line touching the circle $x^2 + y^2 = r^2$ and also,

(*b*) perpendicular to the line $Ax + By + C = 0$;

(*c*) making an angle of 45° with the axis of x;

(*d*) making with the axes a triangle who searea is r^2.

12. Given a point, and a right line or a circle; if on OP the radius vector to the line or circle a part OQ be taken inversely as OP, find the locus of Q.

SECOND YEAR.

MATHEMATICS—(*Advanced Section*).

ANALYTIC GEOMETRY—(*Second Paper.*)

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 12.

1. If any line cut two similar and concentric conics, its parts intercepted by the conics will be equal.

2. If normals be drawn at the extremities of any focal chord of an ellipse, a line drawn through their intersection parallel to the axis major will bisect the chord.

3. Find the locus of the centre of a circle which makes given intercepts on two given lines.

4. Taking the equation

$$(ax + by)^2 + 2gx + 2fy + c = 0$$

(*a*) Give its geometrical interpretation.

(*b*) Show that, by transformation, it can be reduced readily to the form

$$y^2 = px$$

(*c*) Find the new axes for this reduction, so that they shall be rectangular.

5. Drawing the normal at any point of an ellipse to cut the axis major, find the distances of the point of section to the two foci, and show that they are in the same ratio as the lines joining the foci to the point on the ellipse.

6. The area of the parallelogram formed by drawing four tangents to an hyperbola parallel to two conjugate diameters is constant.

7. Prove geometrically, by the method of infinitesimals, that the tangent at any point of an ellipse makes equal angles with the focal radii to that point.

8. The equation of a conic being expressed in its most general form, find the locus of the middle points of all chords parallel to $y = mx$.

9. In any conic the rectangles under the segments of two chords which intersect are to each other as the squares of the diameters parallel to those cords.

10. If the equation of a conic be transformed from one set of rectangular axes to another, prove that the value of $ab - h^2$ remains unchanged. What is the geometrical meaning of this?

11. Find the polar equation of the ellipse, the focus being the pole.

12. Prove that the farther a point on the hyperbola is removed from the centre, the nearer the hyperbola is to its asymptote, but that the curve can never meet the asymptote.

SECOND YEAR.

MATHEMATICS—(*Advanced Section*).

CALCULUS.

THURSDAY, APRIL 23RD, 1903:—AFTERNOON, 2 TO 5.

1. If a function consist of several terms prove that its first derived function is the sum of the first derived functions of its several parts, taken with their proper signs.

2. Find the differential of the product of three functions.

3. Given $u = \phi(y) \quad y = f(x)$

prove that $\frac{du}{dx} = \frac{du}{dy} \cdot \frac{dy}{dx}$

and thence show that $\frac{dx}{dy} = \frac{1}{\frac{dy}{dx}}$

4. Prove *geometrically* that $\frac{d}{d\theta}(\sin\theta)=\cos\theta$

5. Differentiate

$(a + bx^3)^4$, $\cos mx \cos nx$, $\sin^{-1}(1 - x^2)^{\frac{1}{2}}$.

6. If $y = \log \sqrt{\frac{1-\cos x}{1+\cos x}}$ prove $\frac{dy}{dx} = \frac{1}{\sin x}$

7. In a triangle, if the vertical angle be infinitely small, the other angles remaining finite, prove that the difference between the sides is infinitely small compared with either of them.

8. If $f(x)$ and $\phi(x)$ both vanish when $x = a$, prove that the limiting value of $\frac{f(x)}{\phi(x)}$ is in this case the same as that of $\frac{f^1(x)}{\phi^1(x)}$

9. Explain what is meant by maximum or minimum value of a function, and investigate the tests by which these may be found by means of the Calculus.

10. Integrate

$$\int \frac{x^3\,dx}{\sqrt{a^8 - x^8}}; \int \frac{dx}{x^2 - 3}; \int \frac{dx}{x^2 + x - 12}; \int \frac{dx}{\sqrt{x^2 - ax}}.$$

11. Find $\int_0^{\frac{\pi}{2}} x \sin x\,dx$

12. Integrate $\int \frac{(3x^2-1)\,dx}{x^2-3x+2}$

13. Show how to integrate $\int \sin^m\theta \cos^n\theta\, d\theta$ when either m or n in an odd positive integer.

14. Apply the Integral Calculus to find the area of a circle.

SECOND YEAR.

MATHEMATICS—(*Advanced Section*).

PLANE AND SPHERICAL TRIGONOMETRY.

THURSDAY, APRIL 23RD, 1903:—MORNING, 9 TO 12.

A.

1. Solve the equation

$$2 \sin \theta + 2 \cos \theta = \sqrt{2}$$

2. Prove that $\tan^{-1} a + \tan^{-1} b = \tan^{-1} \frac{a + b}{1 - ab}$

3. Prove

$$\sin \theta = \theta - \frac{\theta^3}{\lfloor 3} + \frac{\theta^5}{\lfloor 5} - \frac{\theta^7}{\lfloor 7}$$

4. The angle between two great circles on a sphere is equal to the angle subtended by the arc intercepted by them on the great circle to which they are second-ance.

5. If a point O be taken inside any closed surface, the sum of the solid angles subtended at O by all the element of the surface is 4π

6. In a spherical triangle prove (adopting the usual notation) that

$$\cos a = \frac{\cos A + \cos B \cos C}{\sin B \sin C}$$

B.

7. Prove that $\cos \theta = \frac{e^{i\theta} + e^{-i\theta}}{2}$

$$\text{Sin } \theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$$

8. Find the quadratic factors of $x^n - 2 \cos n\alpha + x^{-n}$, n being a whole number. Hence derive De Moiores property of a circle.

9. Derive the expressions:—

$$(a) \quad \frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \text{etc.}$$

(*b*) $\frac{\pi}{4} = 4\left\{\frac{1}{5} - \frac{1}{3}\cdot\frac{1}{5^3} + \frac{1}{5}\cdot\frac{1}{5^5} - \text{etc.}\right.$

$$- \left\{\frac{1}{239} - \frac{1}{3}\,\frac{1}{239^2} + \frac{1}{5}\,\frac{1}{239^3} \right. + \text{etc.}$$

10. Prove that in a spherical triangle

(*a*) $\tan\frac{A+B}{2} = \frac{\cos\frac{1}{2}(a-b)\cot\frac{C}{2}}{\cos\frac{1}{2}(a+b)}$

(*b*) $\tan\frac{a+b}{2} = \frac{\cos\frac{1}{2}(A-B)\tan\frac{c}{2}}{\cos\frac{1}{2}(A+B)}$

11. In a spherical triangle

$A = 68°.30'$, $B = 74°.20'$, $C = 83°.10'$

Find a and b.

12. The angular distances of three points A, B, C, on the same great circle and any other point P, on the sphere are connected by the relation

$$\sin BC \cdot \cos AP + \sin CA \cos BP + \sin AB \cos CP = 0.$$

THIRD YEAR.

HONOUR MATHEMATICS.

OPTICS.

THURSDAY, APRIL 23RD, 1903:—AFTERNOON, 2.30 TO 5.30.

1. Find a formula for the geometrical focus of a pencil of rays after direct refraction through a thin lens.

The focal length of a double equiconcave lens, whose refractive index is 1.5, is five inches; prove that the distances from the lens of the images of a distant object formed (1) by reflection at the first surface, (2) by one reflection at the second surface, (3) by two reflections at the second surface, are 2½ inches, 1¼ inch, and ½ inch respectively.

2. The focal length of a lens in vacuo is five feet. The refractive indices of glass and water being 3/2 and 4/3 respectively, find the local length of the lens when placed in water.

3. Describe the Astronomical Telescope, and find an expression for the field of view by whole pencils.

The focal length of the object glass of an astronomical telescope is 20 feet and its aperture 15 inches. The eyeglass has a focal length of one inch and an aperture of half an inch. What proportion of the moon's disc can be seen at once in the telescope, the angular apparent diameter of the moon being half a degree?

4. Describe the Ramsden and the Huyghens eyepieces, and contrast their advantages.

5. Prove that for minimum deviation a ray must pass through a prism symmetrically.

The minimum deviation for a prism is 90°. Shew that the least value possible for the refractive index is $\sqrt{2}$.

6. Explain the formation of primary and secondary focal lines when a pencil is obliquely reflected at a concave spherical mirror.

Find a formula for the distance of the primary focal line from the mirror.

7. What is meant by spherical aberration?

Find a formula for the aberration in the case of reflection at a concave spherical mirror.

8. A small plane area is placed parallel to a plane lamina of intrinsic brightness I, of breadth $2a$, and of infinite length, at a distance c from the centre of the lamina in a line perpendicular to the lamina. Prove that the illumination at the centre of the plane area is

$$\frac{\pi a \mathrm{I}}{\sqrt{a^2 + c^2}}$$

9. Obtain the differential equation to the path of a ray in a medium whose refractive index is proportional to the distance from a fixed plane.

10. The refractive indices of one medium for three particular rays of the spectrum are 1.628, 1.642, and 1.660 respectively. Those of another medium for the same rays are 1.525, 1.533, and 1.541 respectively. Shew that these values exhibit a difference of dispersive power, and also the irrationality of dispersion.

THIRD YEAR.

HONOUR MATHEMATICS.

DYNAMICS.

MONDAY, APRIL 20TH, 1903:—MORNING, 9.30 TO 12.30.

1. The resistances to motion of a train being 14 lbs. per (English) ton weight, if the train going 40 miles an hour come to the foot of an incline of 1 in 168, the steam being turned off, find how far it will run up the incline. If it had come to the top of the incline, how far would it have descended before stopping?

2. A body describes a circle with uniform velocity. Find an expression for the acceleration to the centre.

In a centrifugal railway the cars, after descending a steep incline, run round the inner side of a vertical circle 20 feet in diameter, making a complete turn over. Shew that, neglecting friction, they must start from a point not less than 5 feet vertically higher than the top of the circle.

3. A train weighs 120 tons including the engine. The resistances to motion on a level are equivalent to a retarding force of 16 lbs. per ton weight. Find the greatest speed at which the engine can keep it running, if it is of 150 horse power.

If the train is moving at 20 miles an hour, and the engine is working at full power, find the acceleration.

4. Shew that the time of descent down all chords of a vertical circle terminating in the highest or lowest points is the same.

Find the shortest time in which a ring can be made to slide down a wire to a vertical wall from a point distant 20 feet from the wall.

5. Explain how to calculate the velocities of two smooth spheres after direct impact.

A train of cars loaded to equal weights is standing at rest with a space of 3 inches between each car and the next, the utmost the couplings will allow. Another car of equal weight is shunted on to it from behind at one mile an hour. Shew that if the buffers are perfectly elastic and the couplings inelastic, a passenger will experience two forward jerks before

getting into uniform motion, and that if each car is 60 feet long, the mean speed with which the first impulse travels through the train is 241 miles an hour. Find the interval between the two jerks for a passenger in the sixth car from the front; and the velocity with which the train finally starts off if there are 20 cars.

6. A particle moves under an acceleration directed towards a fixed point and proportional to its distance from the point. Shew that its motion is Simple Harmonic, and find expressions for the time of vibration and for the velocity at any distance from the centre of attraction.

In a S. H. M. the velocities at distances 5 and 12 feet from the centre are 36 and 15 feet per second respectively; find its period and the acceleration at the greatest distance from the centre.

7. A bullet is fired from a rifle 4 feet above the ground with a velocity of 2,000 feet per second so as to strike a target at 1,000 yards at the same height of 4 feet. Shew that the rifle must be sighted for an elevation of about 20′, and that a man 6 feet 2 inches in height could stand half way between the rifle and target without being hit.

8. Find expressions for the accelerations along and perpendicular to the radius vector in polar co-ordinates.

9. Obtain the equation for a central orbit

$$\frac{d^2u}{d\theta^2} + u = \frac{P}{h^2u^2}$$

10. Find the moment of inertia of a sphere about a diameter.

11. Explain D'Alembert's Principle and employ it to find the time of oscillation of a compound pendulum.

12. Prove that the centre of oscillation and the centre of suspension are convertible, and point out how Kater employed this fact in the determination of gravity.

THIRD YEAR.

HONOUR MATHEMATICS.

STATICS.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9.30 TO 12.30.

1. The beam of a balance is 18 inches long, and an object appears to weigh 20.34 gms. in one pan, and 20.87 gms. in the other. How much must the fulcrum be shifted to make it true?

2. Define a *Couple*, and shew that the effect of a Couple is not altered by shifting it to any other point in the same plane.

3. Shew how to reduce any number of forces acting in one plane to a single force and a Couple.

Forces of 3, 5, 7, and 9 lbs. weight act along the sides AB, BC, CD, DA of a square, each side being 1 foot long. Find the magnitude and position of the resultant.

4. State the Laws of Friction.

A ladder 20 feet long and weighing 70 lbs. rests at an angle of 45° against a rough vertical wall. A man weighing 140 lbs. climbs up it. If the coefficient of friction at each end be .5, shew that the ladder will slip when he has gone up 13 feet.

5. Define the efficiency of a machine, and shew that if the efficiency is less than one-half, the machine will not run backward when the power is withdrawn.

6. State and prove the principle of Virtual Work for any number of forces acting at a point.

7. The sides of a triangular framework are 13, 20, and 21 inches long. The longest side rests on a smooth horizontal table, and a weight of 63 lbs. is suspended from the opposite angle. Find the tension in the side on the table.

8. Find the centre of gravity of

(*a*) a pyramid on a triangular base.

(*b*) the area included by a loop of the curve $r = a \cos 3\theta$.

9. Find a formula for the tension at any point of a string stretched round a rough curve, neglecting gravity.

10. Investigate the equation to the Catenary.

Shew that the least length of chain which can rest in equilibrium over two smooth pegs in the same horizontal line is e times the distance between the pegs.

MATHEMATICS AND NATURAL PHILOSOPHY (HONOURS).

THIRD AND FOURTH YEARS.

DIFFERENTIAL EQUATIONS.

MONDAY, APRIL 6TH, 1903:—MORNING,, 9 TO 12.

1. Show the manner in which a differential equation $Pp + Qq = R$ is obtained by the elimination of the arbitrary function from $\phi\ (u\ v) = 0$ and thence derive a rule for its solution.

(*a*) Solve the equation $x^2\ p - xy\ q + y^2 = 0$

2. Solve the equation $9\ (p^2\ z + q^2) = 4$.

3. Solve the simultaneous equations

$$(a)\quad \begin{cases} \dfrac{d^2x}{dt^2} = ax + by \\ \dfrac{d^2y}{dt^2} = a^1n \mid b^1y \end{cases}$$

$$(b)\quad \begin{cases} \dfrac{dx}{dt} + 5x + y = e \\ \dfrac{dv}{dt} + 3y - x = e^{2t} \end{cases}$$

$$(c)\quad \begin{cases} \dfrac{d^2x}{dt^2} - a\dfrac{dy}{dt} + m^2x = 0 \\ \dfrac{d^2y}{dt^2} + a\dfrac{dx}{dt} + m^2y = 0 \end{cases}$$

4. Find the condition of integrability of

$$P\,dx + Q\,dy + R\,dz = 0$$

and thence obtain a rule for its solutions.

(*a*) Apply it to the equation

$$(y\,dx + x\,dy)(a - z) + xy\,dz = 0$$

6. Solve $(D^4 + 5D^2 + 6)\,y = 0$.

7. Prove that $f(D)\,e^{ax} = f(a)\,e^{ax}$.

(*a*) In applying this to the solution of the equation

$$f(D)\,z = 0$$

investigate the form the solution takes when two of the roots of

$$f(a) = 0$$

are equal.

8. Prove $F(x\,D)\,x^m = F(m)\,x^m$.

9. Solve $x + y\,p = ap^2$.

10. Solve

(*a*) $(y - x)(1 + x^2)^{\frac{1}{2}}\dfrac{dy}{dx} = n(1 + y^2)^{\frac{3}{2}}$

(*b*) $(1 - x^2)\dfrac{dy}{dx} - xy = axy^2$

(*c*) $x + y\dfrac{dy}{dx} = 2y$

(*d*) $1 + \left(\dfrac{dy}{dx}\right)^2 = \dfrac{(x + a)^2}{x^2 + 2ax}$

HONOURS IN MATHEMATICS AND NATURAL PHILOSOPHY.

THIRD AND FOURTH YEARS.

ASTRONOMY.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. If the distances of the Moon and Sun from the centre of the Earth be respectively 60 r and 23,000 r (where r = radius of Earth) and if the masses of the Moon and Sun be respectively $\dfrac{E}{80}$ and 322,000 E (when E = mass of Earth), prove that the effect of the Moon in producing tides is approximately 2.2 times the effect of the Sun.

2. Prove the following formula for the parallax in the hour-angle (a), where P is the horizontal parallax, l the latitude and h the hour-angle, the declination

$$a = \frac{P \cos l \sin (h + a\delta)}{\cos \delta}$$

3. If ϕ be the geographical latitude of a place and ϕ the geocentric latitude prove that, approximately

$$\phi - \phi^1 = c \sin 2\phi$$

$$\text{where } c = \frac{a - b}{a}$$

4. Find the general differential equation for refraction

$$\frac{dr}{d\mu} = \frac{1}{\mu} \frac{\mu_0 a \sin z}{\sqrt{\mu^2 x^2 - \mu^2 a^2 \sin^2 z}}$$

5. Find the time of the year when the twilight is shortest for a given place.

6. Find the R. A. and Decl. of the Sun when his longitude was 59° 33′ 42″.5 and the obliquity of the ecliptic was 23° 27′ 29″.06.

7. Examine the varying relations between the motions of the mean and the true sun arising from the obliquity of the ecliptic alone, and show that the equation of time vanishes four times a year.

8. If v be the true anomaly and u the excentric anomaly, prove

$$\tan \tfrac{1}{2} v = \sqrt{\frac{1 + e}{1 - e}} \tan \tfrac{1}{2} u$$

9. Find the length of time a star whose N. P. D. is 81° 29′.5 will be above the horizon at a place whose latitude is 51° 45′.5.

10. At a place in lat. 42° 34′ N. the altitude of Aldebaran (Dec. 16° 12′ 36″ N.) was found by observation to be 30° 2′ 10″, find its hour angle.

MATHEMATICS AND NATURAL PHILOSOPHY (HONOURS).

QUATERNIONS.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

1. Define Vector, Unit Vector, Tensor, Scalar, Versor, giving examples. How are the positions of a point, right line (length indefinite), plane, laid down in the Science of Quaternions. Explain the meaning of

$$\rho = xi + yj + zk.$$

2. If $S\alpha\rho = 0$, $S\beta\rho = 0$ be two planes through the origin, show that

$\rho = x\, V\alpha\beta$ is the equation of the line of intersection of the two planes.

3. Find by quaternions the locus of the middle points of all right lines which are terminated by two given right lines not in the same plane.

4. If through a given point (vector β), any number of planes be drawn cutting the sphere $\rho^2 = -a^2$ and cones be constructed touching the sphere along the circles of intersection; prove that the locus of the vertices of the cones is the plane $S\,\beta\rho = -a^2$.

(*a*) If the point be on the sphere what does this equation become, and what does it mean?

5. Give the geometrical definition of the *cissoid*; find its equation in Cartesian co-ordinates; and show that its quaternion equation is

$$(\rho^2 + 2\,S\alpha\rho)\,S\alpha\rho = 2\,a^2\rho^2.$$

6. If points P, Q, R, S be taken in the sides AB, BC, CD, DA of a parallelogram, such that $AP : AB :: BQ : BC$, etc., prove that $PQ\,R.S$ is a parallelogram.

7. If m_1, m_2, m_3, etc., be the masses of particles at the points A, B, C, etc., in space, ρ_1, ρ_2, ρ_3 the vectors to these points, and ρ the vector to the point G (the centre of mass), prove that

$$\rho = \frac{m_1\rho + m_2\rho_2 + m_3\rho_3 + \&c.}{m_1 + m_2 + m_3 + \&c.}$$

8. If GA be a vector (for example ($\rho_1 - \overline{\rho}$), and GA the corresponding line prove that

$$\overline{GA^2} = -GA^2$$

and hence show using the notation of the previous question, that for masses m_1 m_2, etc., as there given,

$$m_1 GA^2 + m_2 GB^2 + m_3 GC^2 + \&c = m_1 OA^2 + m_2 OB^2 + m_3 OC^2 + \&c - (m_1 + m_2 + m_3) OG^2$$

where O is any point whatever.

9. If α, β, γ, are co-initial, coplanar vectors terminating in a right line, prove that the same values, of a, b, c, which make $a\alpha + b\beta + c\gamma = 0$ will also make $a + b + c = 0$

10. If α, β are two vectors not at right angles to one another prove that

$$\alpha\beta = S\alpha\beta + V\alpha\beta$$

explaining the meaning of the equation and expressing it more definitely when α β are not unit vectors.

(a) Show that $\beta\alpha = S\alpha\beta - V\alpha\beta$

(b) Show that $(\alpha-\beta)^2 = \alpha^2 - 2S\,\alpha\beta + \beta^2$.

B.A. HONOUR EXAMINATIONS.

MATHEMATICS AND NATURAL PHILOSOPHY.

LUNAR THEORY.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

1. Express definitely the object of the Lunar Theory, and state briefly the several steps, considering it as the solution of a dynamical problem.

2. If two bodies attract one another according to the law of gravitation, determine the orbit of one *relatively* to the other.

3. Investigate the expression for the mean anomaly in terms of the true anomaly.

$$nt + \epsilon - a = \theta - a - 2e \sin(\theta - a) + \tfrac{3}{4} e^2 \sin 2(\theta - a)$$

4. Give and prove a construction for the *disturbing* force of the Sun on the Moon, when the Moon is not far from *opposition*. Compare the effects in opposition and quadrature.

5. Explain the resolution of the forces on the Moon used in the Theory, and calculate the value of P approximately to the second order.

6. Find the value of $\frac{T}{h^2u^3}$ to the *third* order of approximation, given

$$\frac{T}{h^2u^3} = -\frac{3m'u'3}{2h^2u^4} \sin 2(\theta \quad \theta')$$

7. Assuming

$$\frac{ds^2}{d\theta^2} + s^1 = -\frac{3}{2}m^2k \sin(g\theta - \gamma)$$

$$+\frac{3}{2}m^2k \sin\{(2-2m-g)\theta - 2\beta+\gamma\}$$

find s.

8. Given the form of the expansions for the Moon's co-ordinates at any time, explain any one method for finding the numerical values of the coefficients.

9. Explain the physical meaning of the term

$$\frac{11}{8}m^2 \sin\{(2-2m)pt \quad 2\beta\}$$

in the expression for the Moon's longitude and show that the period of the inequality is 14¾ days.

10. Prove that the Moon's orbit is everywhere concave to the Sun.

HONOUR EXAMINATIONS.

MATHEMATICS AND NATURAL PHILOSOPHY.

CALCULUS AND THEORY OF PLANE CURVES.

WEDNESDAY, APRIL 22ND, 1903:—MORNING, 9 TO 12.

1. Eliminating the arbitrary functions from

$$z = f\left(\frac{y}{x}\right) + \delta(x\,y)$$

show that the result is

$$x^2 r - y^2 t + x p - y q = 0.$$

2. If the independent variable in the equation

$$x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} + \frac{a^2}{x^2} y = 0$$

be changed from x to z, being given $x = \frac{1}{z}$, show that the transformed equation is

$$\frac{d^2y}{dz^2} + a^2 y = 0$$

3. Prove that the moment of inertia of a plane lamina relative to any line drawn through the origin varies inversely as the square of a radius vector of a certain ellipse, and find the equation of the *momental ellipse.*

4. If r be the distance of any point of a closed surface from the origin, γ the angle which r makes with the *internal* normal, and dS the element of the surface, prove that

$$\iint \frac{\cos \gamma \; dS}{r^2} \quad 4\pi, \; 2\pi, \text{ or } 0$$

according as the origin is inside, on or, outside the surface.

5. Prove that the volume included within the surface

$$F\left(\frac{x}{a}, \frac{y}{b}, \frac{z}{c}\right) = 0$$

is $abc \times$ the volume of the surface

$$F(x, y, z,) = 0$$

6. Find the volume of the surface generated by the revolution of the cycloid.

$$x = a(\theta - \sin\theta) : y = a(1 - \cos\theta)$$

round its base.

7. Prove that the rectification of the limacon

$$r = a \cos\theta + b$$

depends on that of the ellipse whose semi-axes are $a + b$ and $a - b$.

8. Assuming the formula for the radius of a curvature of a curve $y = f(x)$, find the expression for it when the curve is given as $f(x, y) = 0$, *i.e.*, $u = 0$.

9. (1) Trace the cubical parabola

$$y^2 = x^2 (x - a).$$

(2) Trace the limacon. When does it become a cardioid?

10. Find the envelope of the line

$$\frac{x}{a} + \frac{y}{b} = 1$$

given $a^m + b^m = c^m$

11. Find the asymptotes of

$$y(x^3 - 3bx + 2b^2) = x^3 - 3ax^2 + a^3.$$

12. Find the nature of the double point on the curve

$$ay^2 = x^3.$$

13. Show that the origin is a point of inflexion on the curve

$$a^3 y = bxy + cx^3 + dx^4.$$

14. Prove the expression for the perpendicular on the tangent to a curve given in polar co-ordinates

$$\frac{1}{p^2} = u^2 + \left(\frac{du}{d\theta}\right)^2$$

FOURTH YEAR.

HONOUR EXAMINATIONS.

MATHEMATICS AND NATURAL PHILOSOPHY.

SURFACES.

THURSDAY, APRIL 23RD, 1903:—MORNING, 9 TO 12.

1. A long line of curvature the variation in the angle between the tangent plane to the Surface and the osculating plane to the curve is equal to the angle between the two osculating planes.

2. Find the partial differential equation of conoidal Surfaces.

3. Find the cylinder the direction cosines of whose edges are l, m, n, and which envelopes the quadric

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

4. If there be three systems of Surfaces such that every surface of one system is cut at right angles by all the surfaces of the other two systems, then the in-

tersections of two surfaces belonging to different systems is a line of curvature on each.

5. If D be the diameter of a quadric parallel to the tangent line at any point of its intersection with a confocal and p the perpendicular on the tangent plane at that point; then $p\,D$ is constant for every point on that curve of intersection.

6. If there be a plane curve common to three quadrics, each pair must also have another common plane curve, and the three planes of these last common curves pass through the same line.

7. Find the equation of the line whose vertex is x^1, y^1, z^1, and which stands on the conic in the plane of x, y,

$$\frac{x^2}{a^2} + \frac{z^2}{b^2} = 1$$

8. Two planes mutually perpendicular pass each through a fixed line; find the surface generated by their line of intersection.

9. Any two circular sections of an ellipsoid belonging to opposite systems lie on the same sphere.

10. The sum of the squares of a system of three conjugate semi-diameters of an ellipsoid is constant.

11. Find the condition that the plane

$$Ax + By + Cz + D = 0$$

should touch a quadric given by the general equation.

12. Find the condition of intersection of the two lines

$$\frac{x - x_1}{a_1} = \frac{y - y_1}{b_1} = \frac{z - z_1}{c_1}$$

$$\frac{x - x_2}{a_2} = \frac{y - y_2}{b_2} = \frac{z - z_2}{c_2}$$

FIRST YEAR.

PHYSICS.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. A train of 360 tons running at 40 miles an hour is brought to rest by the brakes (1) in 70 seconds, (2) in

700 yards. Find the retarding force exerted in each case.

2. State the Principle of the Inclined Plane.

What must be the Horse-Power of an engine which can keep a train of 200 tons running up an incline of 1 in 200 at 30 miles an hour (1) neglecting friction, (2) supposing the resistances to motion to be equivalent to a retarding force of 16 lbs. per ton?

3. Describe the mercury barometer, and explain how it measures the pressure of the atmosphere.

If the barometer goes up one inch, what difference will it make in the pressure of the air on one square foot, supposing mercury to have a specific gravity of 13.6 and a cubic foot of water to weigh 1000 ounces?

4. A substance weighs 8.17 gms. in air and 7.74 gms. in water. What is its specific gravity?

5. In a certain experiment 380 cc. of a gas are given off when the thermometer reads 21°C and the barometer is at 772mm. What will be the volume of the gas at 0°C and 760mm?

6. Explain what is meant by the statements:—(1) the Specific Heat of ice is .5; (2) The latent Heat of ice is 80.

1 lb. of ice at -12°C is placed in 10 lbs. of water at 18°C. What will be resulting temperature?

7. Give a formula for the number of vibrations per second made by a stretched string.

A string is to be made to give a note one octave higher by altering either its length or its tension. What must be done in each case?

8. Describe and explain the construction of a telescope.

A telescope is turned on a moderately distant object and focussed by a rather short-sighted person so that the image appears to be only a foot or two away.: Mark on a diagram the relative positions of (1) the focus of the object-glass, (2) the image formed by the object-glass, (3) the focus of the eye-piece.

9. Contrast the advantages of the Corpuscular and the wave theories of Light in *one* of the two following points:—

(*a*) Explanation of the *high* velocity of light *which is the same for light from all sources.*

(*b*) Explanation of Refraction.

10. Describe and explain the action of the Electrophorus. Briefly indicate how electric machines have been built on this principle.

11. Describe any Two-fluid Primary Battery. What was the object of their construction?

Six Daniell cells of E. M. F. 1.079 are connected in series to a line of 182 ohms resistance. If each cell has a resistance of 6.2 ohms, express the current that flows in thousandths of an Ampere.

12. Describe the essential parts of a Dynamo, explaining the purpose of each and the action of the whole machine.

THIRD YEAR.

EXPERIMENTAL PHYSICS—SOUND, LIGHT AND HEAT.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. Find the absolute zero on the Fahrenheit and on the Réaumur Scale.

2. How would you determine the latent heats of water and steam? It is found that a kilogramme of water at 100°C. mixed with a kilogramme of melting ice without loss of heat, gives two kilogrammes of water at the temperature 10.36°C.; find the latent heat of water.

3. Describe the Regnault hygrometer. How would you calculate the relative humidity from a knowledge of the dew point?

4. Explain what is meant by critical temperature and pressure. How were the permanent gases liquified, and what are the necessary conditions for obtaining liquid air in quantity?

5. Find the quantity of heat conducted per hour through each square meter of the surface of an iron steam boiler 0.8 cm. thick, when the temperature of the inner surface of the boiler is 120°C. and that of the outer 119.5°C. The conductivity of the iron may be taken as 0.19 in C. C. S. units.

6. Describe and explain the action of (*a*) Crooke's radiometer, (*b*) Boy's radiomicrometer.

7. State the first and second laws of thermodynamics.

8. How would you calculate the maximum work that could be obtained from a perfect heat engine?

9. Describe the method of comparing the values of the velocity of sound in different gases by means of Kundt's Tube, explaining the principles on which it depends. Could this method be adapted to compare the velocities in wood, glass, and the different metals?

10. Given a Spectrometer, a prism, and a sodium flame. Describe carefully (*a*) the preliminary adjustments to be made, (*b*) the method of finding the angle of the prism, and (*c*) how to measure the minimum deviation for sodium light. Give the formula by which you could then calculate the index of refraction of the prism for sodium light.

11. Describe some form of Photometer, and explain the principle on which it depends.

12. The length of a violin string is 33cms. and its mass is: 524gm. What tension must be applied to it to make it vibrate 280 times per second?

THIRD AND FOURTH YEARS.

EXPERIMENTAL PHYSICS.

ELECTRICITY AND MAGNETISM.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. State what you know of the Leyden Jar discharge. How would you measure the period of oscillation of the discharge? Describe the arrangement of the Leyden jars and connections in the experiment of the "alternative path."

2. Define the term "surface density of electricity." How does the distribution of electricity depend on the shape of a conductor?

Explain the discharging action of points and its application to protection of buildings from lightning.

3. Describe the action of (1) a simple type of Hertzian vibrator, (2) a coherer.

4. Show by careful diagrams the distribution of magnetic lines of force round (*a*) a long straight wire, (*b*) a circular coil, (*c*) a solenoid through which electric currents pass.

Find the strength of the magnetic field, (*a*) at the axis, (*b*) at the end of a solenoid 50 cms. long, 2 cms. in diameter wound with 1000 turns of wire and carrying a current of 5 ampères.

5. Show how the magnetism developed in iron depends on the strength of the magnetizing current.

What is meant by magnetic hysteresis?

Contrast the magnetic properties of soft iron and steel.

6. What is the effect of temperature on the electrical resistance of metals, alloys and electrolytes? How would you determine the temperature coefficient of copper wire between 0°C. and 100°C?

7. Four large storage batteries in series E.M.F. of each 2.2 volts and internal resistance of each .002 ohms, send a current through two external resistances of .1 and .01 ohms arranged first in series and then in parallel. Find in each case the current drawn from the cells and the watts absorbed in the resistances.

8. State Faraday's laws of the induction of electric currents.

An earth coil mounted on a horizontal axis placed in the meridian is rotated at a uniform speed. Find

(*a*) The E.M.F. induced in the coil at each position in its revolution;

(*b*) The average E.M.F.

9. Find (*a*) the magnitude and direction of the force experienced by straight vertical wire 20 cms. long carrying a current of 20 amperes in a uniform horizontal north and south field of 6000 lines per square centimetre.

(*b*) The E.M.F. produced in the same wire when it is carried due east in the field at a rate 5 metres per second.

10. Describe the construction and action of an alternating current transformer.

What type of transformer is used for electric welding?

11. Describe and explain the action of any *two* of the following:

(*a*) Electromagnetic interrupter of an induction coil;

(*b*) Wehnelt interrupter;

(*c*) Telegraphic relay.

CHEMISTRY

SECOND YEAR.

CHEMISTRY.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

1. Give a brief account of the preparation and properties of nitric acid. Explain its use as an oxidising agent.

2. Enumerate the various oxides of nitrogen and describe for each a method of preparation.

3. How, and from what sources, is phosphorus obtained? Give an account of the halogen compounds of phosphorus.

4. Describe a method by which the atomic weight of an element may be determined.

5. Enunciate and give a short account of the Periodic Law.

6. Give a brief account of the general physical and chemical properties of the elements of the first group.

7. Describe a method of preparing aluminium, and indicate its chief chemical reactions.

8. What is bleaching powder? Mention some of its industrial applications and tell how it is prepared.

9. What do you know about the modern theory of solutions?

10. Describe the preparation and the uses of potassium permanganate.

THIRD YEAR.

ORGANIC CHEMISTRY.—(*First Paper.*)

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 11.

Note.—*Candidates in Applied Science and in Arts Honours will substitute questions 7 and 8 for 1 and 2.*

1. Explain and exemplify the meaning of isomerism by reference to (*a*) the paraffins, (*b*) the amines, (*c*) the cyanogen compounds.

2. Distinguish between primary, secondary and tertiary alcohols, and explain the behaviour of each on oxidation.

3. By what methods would you prepare a primary alcohol from

(1) An alkyl bromide;
(2) An amine;
(3) An ester?

Discuss the constitution and general reactions of this class of organic compounds.

4. What is meant by an unsaturated compound? Give an account of the chemistry of the acetylene series of hydrocarbons.

5. Tell what you know of the methods of formation and of the products of decomposition of the dibasic acids.

6. What are the Lactic acids? Indicate their chemical behaviour, and explain how the peculiar variety of isomerism met with here is accounted for.

7. Give an account of the method of preparation of acetoacetic ether and of its applications in organic synthesis.

8. Starting from ethylene how could you prepare (1) oxalic acid, (2) succinic acid, (3) tartaric acid?

THIRD YEAR.

ORGANIC CHEMISTRY.—(*Second Paper.*)

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 11.

NOTE.—*Candidates in Applied Science and in Arts Honours will substitute questions 7 and 8 for 1 and 2.*

1. Give in outline the products obtained from coal tar and the methods employed in their isolation.

2. Illustrate with reference to toluene how the accepted structural formula accounts for its various mono- and di-substitution products.

3. Compare the observed properties of benzene with those which analogy with the aliphatic series would suggest for the substance *C*

4. Give a detailed account of the "Sandmeyer" reaction.

5. Given a specimen of dinitrobenzene, how would you proceed to determine whether it possesses the ortho, meta or para formula?

6. Describe *three* reactions which illustrate the extreme reactivity of the para hydrogen atom in a phenol or in an aromatic amine.

7. Describe the method which has been employed in deducting the symmetry of the benzene molecule.

8. What reactions are made use of in establishing the constitutional formula of naphthalene, and how does this formula agree with the observed number of mono- and di-substitution products?

ELEMENTARY BIOLOGY

SECOND YEAR.

ELEMENTARY BIOLOGY.

ANIMAL BIOLOGY.

DECEMBER, 1903.

TIME: TWO HOURS FOR MEDICAL STUDENTS.

THREE HOURS FOR STUDENTS IN ARTS.

Students belonging to the Faculty of Medicine must only attempt SIX questions, which are to be selected from Nos. 1-7. Students belonging to the Faculty of Arts may attempt NINE questions, of which THREE are to be selected from Nos. 8-11.

1. Give a short description of the *physical structure* and *chemical composition* of living substance. Show the bearing which the structure you describe has on the performance of the functions of assimilation and respiration.

2. Describe carefully the process of sexual union as it occurs in Hydra, and compare it, point for point, and its results, with the process of conjugation and its results observed in Paramoecium.

3. Define carefully the terms *excretion* and *secretion*. Describe the means by which excretion is performed in the worm, explaining the structure of the organs which perform it.

4. Describe the *origin*, *function* and *structure* of the blood-vessels in the worm, and give the arrangement of the principal vessels.

5. Describe the principal *glands* which open into the alimentary canal of the dog-fish, explaining the functions of each.

6. Describe the development and structure of the *eye* of the dog-fish, including in your description the mi-

croscopic structure as well as the gross anatomy. Explain the functions of the parts you describe.

7. Describe the microscopic structure of the spinal cord and attached nerves of the dog-fish as seen in transverse section, showing how the cells composing the organs you describe are related to the primary layers (i.e., ectoderm and endoderm) of the dog-fish. Show how the phenomenon of *referred pain* is to be explained by the facts you have described.

8. Describe and compare the skeletons of the fore-limb of the frog and of the pectoral fin of the dog-fish.

9. Describe, so far as you know them, the *muscular* and *skeletal* arrangements which subserve respiration (expiration and inspiration) in the frog. Compare them with corresponding arrangements in the dog-fish.

10. Describe and compare the *venous systems* of the frog and the dog-fish.

11. Give a description of the female reproductive organs and their relations to the kidney in the dog-fish and in the frog, in each case tracing the fate of the egg, from its first origin till the birth of the young animal.

SECOND YEAR.

ELEMENTARY BIOLOGY.

BOTANY.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

1. Describe fully a typical unicellular alga, noting the functions of each part.

2. Give an account of the sexual reproduction of Oedogonium, and compare it with that of Spirogyra.

3. Discuss the nature and function of the apophysis of Polytrichum, showing to what structures in higher plants it is physiologically equivalent.

4. Compare the gametophytes of Pteris, Selaginella and Pinus.

5. Give an account of the functions of the vascular system of plants and compare that of a fern, a monocotyledon and a dicotyledon.

6. Discuss the origin of the sporophyte, and note its relative importance in the Bryophytes, Pteridophytes and Spermaphytes.

7. Describe, giving examples, some of the chief methods of securing cross fertilization in the seed plants, and explain the value of such cross fertilization.

8. Compare the gametophyte of a fern, a gymnosperm and a dicotyledon with respect to phases in progressive degeneracy, and show how such alterations are related to higher types of development.

9. State what you know of the nutritive processes in plants.

SECOND YEAR.

CONTINUATION BIOLOGY.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

1. Describe the skull of the Rabbit showing how the essential parts of the typical skull (cranium, sense-capsules and visceral arches) enter into its composition.

2. Describe the brain of the Rabbit and compare it with that of the Dog-fish.

3. Describe the salivary glands of the Rabbit, giving both their appearance as seen in dissection, their position and their minute structure as seen by the microscope. State what you know as to the character of their secretions.

4. Describe the kidney of the Rabbit giving the minute histological structure of the organ and including in your description the ducts which evacuate its secretion. Show how far the organ and its duct are represented by the similarly named organs in the Dog-fish.

5. Carefully describe the structure of a bone as seen in longitudinal and transverse section. Explain how bone replaces cartilage in growth.

6. Describe carefully a tranverse section through the spinal cord of the Rabbit at the region where the nerves are given off to the fore limbs, explaining so far as you can the significance of the cells seen in the section and the destinations of the various bands of fibres.

SECOND YEAR.

CONTINUATION BIOLOGY (PRACTICAL).

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 5.

1. Describe the bones submitted.

2. Stain, mount, draw and describe the histological section provided.

3. Identify the preparations submitted.

SECOND YEAR.

SUPPLEMENTAL EXAMINATION IN ANIMAL BIOLOGY.

FRIDAY, APRIL 17TH, 1903:—AFTERNOON, 2 TO 5.

Eight questions only to be attempted.

1. Describe carefully the cells by which movement is effected in Hydra, the Worm and the Dog-fish. Show how the more complicated types of cell which you describe may be supposed to have developed from the simpler ones.

2. Describe carefully the processes of *ingestion* and *defaecation* as observed in the case of Paramoecium. Point out in what respects they are differently performed in Amoeba, and explain the reasons for the difference between Amoeba and Paramoecium in this respect.

3. Explain exactly what is meant by the term "fertilization of the ovum." Describe carefully the reproductive organs of the Worm and explain the part which each organ has to perform in the processes leading up to and culminating in fertilization.

4. Define the term *respiration*. Describe carefully the structures concerned in respiration in the Worm and the Dog-fish.

5. What exactly are the functions of the central nervous system? Describe the structure and development of the central nervous system of the Dog-fish.

6. Describe carefully with diagrams the structure and development of the ear of the Dog-fish.

7. Describe the structure of the heart and arrangement of the main arteries in the cases of the Dog-fish and of the Frog and show how the two animals are related to one another in this respect.

8. Explain the meaning of the terms *cartilage-bone* and *membrane-bone*. Draw the skull of the Frog as seen from above, naming the bones and cartilages and indicating which are membrane-bones and which cartilage-bones.

9. Describe the arrangement of the veins which return the blood to the heart from the part of the body lying behind the heart in the Frog and the Dog-fish, and show how the arrangement in the former animal has been derived from that in the latter.

BOTANY

THIRD YEAR.

BOTANY.

SPECIAL MORPHOLOGY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

1. Describe the structure and method of reproduction of Calothrix.

2. Discuss the origin of sex in plants and the differentiation of the gametes.

3. Give an account of the development of the vegetative organs of Laminaria.

4. Describe the reproductive processes of Albugo portulacea. In what particulars does Albugo bliti differ from the former?

5. State what you know of Symbiosis, and give examples of various kinds of symbiotic relations.

6. Give an account of Ricciocarpus natans and compare its structure with that of Anthoceros.

7. Compare briefly fossil Equisetineae with modern forms.

8. Write a full description of Isoetes, and discuss the probable relationships of the group.

9. Compare the vascular systems of Angiopteris and Lycopodium.

10. Discuss "Alternation of Generations," and the origin and development of the sporophyte.

FOURTH YEAR.

BOTANY.

SPECIAL MORPHOLOGY.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

1. Compare the Gametophyte of the Gymnosperms with that of the ferns and of Selaginella, showing the significance of progressive degradation.

2. Describe fully the sequence of events in the development of the egg and prothallus in Angiosperms, and show what variation occurs between the Monocotyledons and Dicotyledons.

3. Discuss fully the structure and distribution of the resin canals in the Coniferae.

4. Describe a vascular bundle of the open collateral type; show what plants it is characteristic of and how it is related to secondary growth of the stem.

5. Describe in full the structural characteristics and reactions of collenchyma, its distribution in plants, and its probable purpose.

6. Discuss as fully as you can, the various phases in mitotic division of the nucleus, and the significance of reduction in the chromosomes.

7. Describe as fully as you can, the structure of a leaf of a normal Dicotyledon, and show what structural alterations may arise in adaptation to environment, especially with reference to light and moisture. Compare with the structure of the leaf of a Conifer.

8. Discuss the structure of a root, comparing it with that of a stem of the endogenous type, and show fully what features of development and structure distinguish the two organs.

9. Discuss the structure, origin and purpose of lenticels.

FOURTH YEAR.

BOTANY.

SYSTEMATIC.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. Give as full a statement as you can of the systematic position of the genus Cordaites and its relation to existing types. Of what geological periods is it characteristic?

2. Describe the general characteristics of the Cycadaceae; give an account of their phylogenetic relations and show their distribution in geological time.

3. Give as full an account as you can of the characteristics of the Angiosperms, and bring out their contrasts with the Gymnosperms.

4. State what you can respecting the characteristic features of a grass (vegetative organs and flower), and discuss its systematic position.

5. Discuss the morphological features of the Liliaceae and compare with the Amaryllidaceae. Give an example of each family.

6. Discuss some of the more notable adaptations to cross fertilization, showing what agencies are involved and the methods developed for the prevention of close fertilization.

7. Discuss the Leguminosae with respect to the character of the flower, special adaptations to dispersion and its economic uses.

8. Discuss the Ranunculaceae with respect to the character of the inflorescence, and the development of useful or injurious properties.

9. Discuss the Monocotyledons and Dicotyledons as a whole, comparing them with reference to general characteristics, relative development and distribution in geological time.

FOURTH YEAR.

BOTANY.

PLANT PHYSIOLOGY, I.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. Give a concise account of Cytoplasm respecting;

(*a*) Its chemical and physical properties.

(*b*) Its general relation to external influences.

(*c*) Its distribution in and relation to living tissues.

2. Give as full an account as you can of the process of respiration and the special conditions which influence its operation.

3. Describe the process by which plants obtain their carbonaceous food; the special conditions by which it is promoted or controlled; the extent of its occurrence in plants and the relation which it establishes between plants and other forms of life.

4. Describe the process of transpiration and show

(*a*) Its relation to body temperature and movement of nutrient fluids.

(*b*) Some of the special structural adaptations by which it may be controlled.

5. Give an account of the special functions of the root as to

(*a*) The mechanism of root pressure.

(*b*) Its relation to nutrition and movement of nutrient fluids.

6. How many chemical elements enter into the composition of plants and what are they? State how, from what source and in what forms they are obtained. Explain why the same element is found in varying proportions in different plants.

7. Give an account of the circumnutation of a tendril as to

(*a*) Its purpose.

(*b*) The way in which it is performed.

(*c*) The external conditions which serve to modify the particular direction of movement.

8. What is the purpose of sleep movements in plants? Show how they are expressed and explain the mechanism by which they are accomplished in Robinia.

9. Give as concise and full an account as you can of the laws of inheritance and the medium of transmission, with special reference to Mendel's Law.

FOURTH YEAR.

BOTANY.

PLANT PHYSIOLOGY, II.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. Describe carefully a method by which the Root Action may be indicated and measured. How may such action be shown by artificial cells?

2. Give a method for determining the absolute transpiration of a plant as expressed in terms of grammes per square decimetre of surface.

3. Show how the relative transpiration of different surfaces may be proved, in relation to distribution of stomata and other structural modifications.

4. Give a method for determining the rate of movement in a transpiration current. Show (*a*) what rate may be developed, (*b*) how the rate may be influenced by external conditions and by structural modifications.

5. What do Hales' experiments prove with respect to the vertical growth of plant organs, and how are such experiments conducted? Give an experimental proof that such growth is not merely passive.

6. Describe a method for determining the respiration of plants, and show to what extent the products may be developed.

7. Give a method for determining the effect of electrical stimulus upon a living cell, and describe the exact nature of the results.

8. How may experimental results be exhibited graphically in such a way as to show their relations to temperature and moisture?

9. Give a method for determining the circumnutation figure of a growing stem; and show how this figure is to be interpreted with respect to (1) growth of lateral members, (2) unequal tension of tissues, (3) geotropism and (4) heliotropism.

ZOOLOGY

THIRD AND FOURTH YEARS.

ZOOLOGY.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. Describe the anatomy and reproduction of *Polystomella* pointing out the meaning of its dimorphism.

2. Describe the development of *Aurelia*, showing how each part in the adult is formed.

3. Describe the various forms of mouth-parts met with amongst Insecta and show how they all may be regarded as modifications of a single type.

4. Compare the structure of a typical lamellibranch mollusc like *Unio* with that of a pulmonate gastropod like *Helix* accounting so far as you can for the differences between them.

5. Describe the hydrocoele (including all its outgrowths) in the Starfish, and show how it is related to the cœlom.

6. Write a complete zoological account of *Amphioxus*.

7. Compare the visceral skeletons of *Amiurus* and *Lepus*.

THIRD AND FOURTH YEARS.

ZOOLOGY (PRACTICAL).

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. Dissect the specimen *A* (mytilus edulis) so as to show the greatest possible number of organs, marking their positions with fleg labels. Sketch your preparation.

2. Stain, mount and identify the specimens *B* (Obelia) and *C* (Daphnia), giving in each case reasons for your conclusion.

3. Refer the specimens *D*....*H* as nearly as possible to their places in the general scheme of zoological classification.

Acmsea
Gorgonocephalus
Pluteus
Ascidia
Timanda

4. Sketch and name the bones *I*, *II*, etc....

Rabbit.
- Sacrum
- Humerus
- Lumbar Vertebra
- Mandible.

ZOOLOGY.
ADVANCED COURSE.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

1. Describe completely the life history of any one species of Cestode.

2. Name and classify as many parasitic insects as you can. What other group of the Arthropoda includes many parasitic species?

3. Describe the various forms of paired fin found in living and fossil fish, tracing the evolution of the modern type as found in the Cod from the most primitive forms.

4. Describe the process by which the notochord has become replaced by a bony vertebral column.
(1) in a Urodele Amphibian such as *Necturus*.
(2) in the Frog;
(3) in the Rabbit.
Point out how far the vetebrae and their outgrowths in these three animals correspond to one another.

5. Give a full account of the skeleton of one of the older Dinosauria such as *Compsognathus*.

6. Describe the various forms of palate met with in birds.

7. Describe and compare the method of "formation of the layers" in the eggs of a Sea Urchin and a Bird respectively.

ZOOLOGY (PRACTICAL).

ADVANCED COURSE.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. Dissect and mark with flag labels, showing in each case both origin and insertion, the following muscles of the Rabbit provided:
   (*a*) Sternomastoid.
   (*b*) Rhomboideus cervicalis.
   (*c*) Biceps brachii.
   (*d*) Gluteus maximus.
   (*e*) Soleus.
   (*f*) Extensor communis digitorum.
2. Draw the skull provided (of a Lizard) marking in your sketch the following bones (*a*) ectopterygoid, (*b*) quadratojugal, (*c*) pro-otic.
3. Stain, mount and indentify the specimen *A* (Distornum varicum), giving reasons for your conclusions.

ZOOLOGY (HONOURS).

THE PRINCIPLES OF BIOLOGY, BY HERBERT SPENCER.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

1. Give Spencer's formula of evolution from which he tries to deduce the laws of biology.
2. Give an account of Spencer's analyses of the various kinds of Growth and Development which occur in the animal kingdom. How does he discriminate between Growth and Development?
3. Give an account of the evidence which Spencer adduces to show that acquired qualities may be inherited, and criticize this evidence.
4. Give an account of Spencer's criticism of the special creation hypotheses pointing out how far it is sound.
5. Give an account of Spencer's theory of physiological units, adducing any reasons for or against this hypothesis which may present themselves to you.

GEOLOGY

THIRD AND FOURTH YEARS.

GEOLOGY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12 AND 2 P.M.

1. What do you understand by the term Metamorphism? State what you know concerning its causes and results.

2. State what you know concerning the distribution of Volcanoes upon the present surface of the earth. Describe the recent volcanic eruptions in Martinique and compare them with the eruption of Vesuvius in the year 79 A.D.

3. Show how the geological structure of a country influences its topography. Give examples.

4. Outline the conditions which are necessary for the accumulation of beds of coal in the earth's crust. Where are these conditions now most nearly reproduced in eastern North America? Describe two typical coal plants of the Carboniferous.

5. The Trilobites. Their place in the zoological classification. When do they first appear and what is the last system in which they are found? Describe and figure any three genera and in each case state its range.

6. Describe briefly the following geological formations, in each case state their age and name any economic products which they afford:—

Mountain Limestone, Utica, Clinton, Grenville, Trenton.

7. Draw a sketch map of the Continent of North America and show what portions of it were dry land after the Appalachian Revolution.

8. State what you know concerning the Mesozoic Reptiles.

9. State the mineralogical composition, the structure, the origin and the mode of occurrence of the following rocks:—

Shale, Syenite, Trachyte, Arkose, Grit, Peridotite.

10. State what you know concerning the Cretaceous System as developed in Canada.

2 O'CLOCK P.M.

11. Name the fossils exhibited. State their position in the zoological classification and mention the geological formation to which they belong.

12. Name and describe the mineral and rock specimens.

THIRD YEAR.

DETERMINATIVE MINERALOGY (HONOURS).

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

1. Describe the production of the oxidising and reducing flames; and point out their distinguishing characteristics.

2. Explain the terms decrepitation, intumescence, gelatinisation, fluorescence, deflagration, exfoliaton.

3. Make notes on the determination of (*a*) lustre, and (*b*) fusibility of minerals.

4. What are the principal uses of the following reagents in determinative mineralogy: Potassium bisulphate, potassium iodode and sulphur, metallic tin, cobalt nitrate, fluor-spar, microcosmic salt?

5. What is the object of roasting; how is the operation carried out; and what are the principal chemical changes involved?

6. Mention the more important results obtained upon heating minerals in the closed tube.

7. What are the more important phenomena to be observed in the action of hydrochloric acid on various minerals, and what precautions are to be taken in making these observations?

8. Give the reactions of the following elements:

Antimony, boron, calcium, manganese, nickel, silicon.

9. Give the blowpipe characters of: Arsenopyrite, calamine, celestite, chromite, franklinite, serpentine.

10. Give a sketch of the course to be followed in the determination of a mineral which is unknown to you.

THIRD YEAR.

HONOURS IN GEOLOGY AND MINERALOGY.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 1.

1. Explain the relationship of the different Hex-octahedrons in the Isometric System.

2. Give the symbols of Naumann and indices of Miller for the various type forms in the Triclinic System.

3. Explain carefully the nature of twin crystals, describing some of the principal types of twinning. State also what you understand by parallel grouping.

4. Give the indices of the six upper faces of the unit Hexagonal Pyramid.

5. Give spherical projections of any two of the three crystals (or models) marked *A*, *B*, *C*.

6. What are the principal surface and internal imperfections of crystals?

7. State what you know with regard to the sources, mode of occurrence and characters of native Platinum.

8. Give brief descriptions of each of the following species:—Millerite, Pyrrhotite, Pyrargyrite, Corundum, Rutile, Gothite.

9. Give the composition of each of the following:—Hessite, Sylvanite, Jamesonite, Gahnite, Ilmenite, Polianite, Brookite.

10. Calculate the formula of each of the minerals A and B which gave respectively on analysis the following percentage composition:—(A) Lead 50.42, Copper 0.26, Antimony 29.25, Arsenic 0.23, Sulphur 19.75; (B) Ferric Oxide 85.20, Manganic Oxide 0.35, Water 14.28.

11. Name and describe the mineral specimens exhibited. Describe also any three of the crystal models, giving symbols of planes.

SESSIONAL EXAMINATIONS

FACULTY OF APPLIED SCIENCE

1903

ARCHITECTURE

SECOND YEAR.

ELEMENTS OF ARCHITECTURE.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.30.

1. In a lofty boundary-wall an Entrance is to be made; dimensions of opening, not less than ten feet high by five feet wide.

Sketch two designs, the one, square-headed, the opening flanked by Greek Ionic columns; the other, arched, forming a Roman composite arcade, of either the Doric or the Ionic order.

Elevation and Section of each are required, to half inch scale, in pencil (on tracing-paper, if preferred), with a half-plan, which may be hatched in on elevation.

2. Sketch the profile of the Greek Doric capital; criticize the design of the capital, adding a note on the chief modifications of form adopted in the Roman order.

SECOND YEAR.

HISTORY OF ARCHITECTURE.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

(*Five questions only to be attempted.*)

1. Give a brief description of the Acropolis, Athens, and the classical buildings upon it, with a fuller architectural account, with sketch-plan of *either* the Propylaea *or* the Erechtheum.

2. Give an account, with special reference to its constructive design, of the Basilica of Constantine, Rome, with sketch-plan and section, as illustrating Roman Imperial architecture.

3. Contrast the entrance-front of a French Gothic cathedral with the east front of the Parthenon, Athens, discussing the two types of architecture with reference to (1) structure; (2) decoration; (3) aesthetic effect and significance.

4. Trace the development of Gothic vaulting from Romanesque sexpartite to late Gothic fan-vaulting in England, giving diagram-sketches, and explaining the terms: "lierne," "tierceron," "severey," "ridge-rib," "four-centred arch."

5. Give an account, historical and structural, of the dome of the cathedral at Florence, comparing it with Santa Sophia at Constantinople.

6. Give a diagram-section of the Great Pyramid, describing it briefly, and adding its principal dimensions.

Write a note on the mathematical ratios that seem established as the basis of its design. What do we know as to the mechanical methods of its builders, and their organization of labour?

7. Give a brief account of a mediaeval abbey, and estimate the influence of the Cistercian Order upon the development of early Gothic architecture.

CHEMISTRY

SECOND YEAR.

CHEMISTRY.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

1. Give a brief account of the preparation and properties of nitric acid. Explain its use as an oxidising agent.

2. Enumerate the various oxides of nitrogen and describe for each a method of preparation.

3. How, and from what sources, is phosphorus obtained? Give an account of the halogen compounds of phosphorus.

4. Describe a method by which the atomic weight of an element may be determined.

5. Enunciate and give a short account of the Periodic Law.

6. Give a brief account of the general, physical and chemical properties of the elements of the first group.

7. Describe a method of preparing aluminium, and indicate its chief chemical reactions.

8. What is bleaching powder? Mention some of its industrial applications and tell how it is prepared.

9. What do you know about the modern theory of solutions?

10. Describe the preparation and the uses of potassium permanganate.

THIRD YEAR.

ASSAYING.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. Make a careful sketch (which may be diagramatic) of the essential parts of a balance for weighing gold and silver beads.

What degree of sensitiveness is required in a balance for assaying gold ores. On what does the sensitiveness of a balance depend.

2. What is the weight of an assay ton. How is this weight obtained. When would you use the assay ton and when the gram weights.

3. Mention some reducing reagents used in fire-assaying. Explain their action and state how you could compare the reducing power of these reagents.

4. How would you obtain samples for assaying:—
(1) Of bars of gold containing silver and copper;
(2) Of pigs of lead containing gold and silver.

5. State exactly how you would proceed to obtain accurately the percentage of gold and of silver in the samples referred to in question 4.

6. Give the charge suitable for determining the lead in a galena. Describe in detail the manner in which you would carry out the assay.

7. What examination of a silver ore would you make before assaying it by a crucible method. How would you modify your charge as the result of this examination.

8. What is the usual amount of loss in cupelling silver with lead. What is the cause of this loss and how is it affected by the presence of copper, the amount of lead, and the temperature of the cupellation.

THIRD YEAR.

ORGANIC CHEMISTRY.—(*First Paper.*)

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 11.

NOTE.—*Candidates in Applied Science and in Arts Honours will substitute questions 7 and 8 for 1 and 2.*

1. Explain and exemplify the meaning of isomerism by reference to (*a*) the paraffins, (*b*) the amines, (*c*) the cyanogen compounds.

2. Distinguinsh between primary, secondary and tertiary alcohols ,and explain the behaviour of each on oxidation.

3. By what methods would you prepare a primary alcohol from

(1) An alkyl bromide;
(2) An amine;
(3) An ester?

Discuss the constitution and general reactions of this class of organic compounds.

4. What is meant by an unsaturated compound? Give an account of the chemistry of the acetylene series of hydrocarbons.

5. Tell what you know of the methods of formation and of the products of decomposition of the dibasic acids.

6. What are the Lactic acids? Indicate their chemical behaviour, and explain how the peculiar variety of isomerism met with here is accounted for.

7. Give an account of the method of preparation of acetoacetic ether and of its applications in organic synthesis.

8. Starting from ethylene how could you prepare (1) oxalic acid, (2) succinic acid, (3) tartaric acid?

THIRD YEAR.

ORGANIC CHEMISTRY.—(*Second Paper.*)

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 11.

NOTE.—*Candidates in Applied Science and in Arts Honours will substitute questions 7 and 8 for 1 and 2.*

1. Give inoutline the products obtained from coal tar and the methods employed in their isolation.

2. Illustrate with reference to toluene how the accepted structural formula accounts for its various

mono- and di-substitution products.

3. Compare the observed properties of benzene with those which analogy with the aliphatic series would suggest for the substance C_6H_6.

4. Give a detailed account of the "Sandmeyer" reaction.

5. Given a specimen of dinitrobenzene, how would you proceed to determine whether it possesses the ortho, meta or para formula?

6. Describe *three* reactions which illustrate the extreme reactivity of the para hydrogen atom in a phenol or in an aromatic amine.

7. Describe the method which has been employed in deducting the symmetry of the benzene molecule.

8. What reactions are made use of in establishing the constitutional formula of naphthalene, and how does this formula agree with the observed number of mono- and di-substitution products?

THIRD YEAR.—(*Mining Course.*)

QUALITATIVE ANALYSIS.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

1. Define the terms: Reagent, precipitant, incineration, solvent.

2. Describe the following operations: Filtration, evaporation, ignition.

3. Give an outline of the methods usually employed for effecting the solution of unknown substances submitted for qualitative analysis.

4. A solution contains silver, lead and copper as nitrates; describe the method of determining the presence of these metals.

5. In the usual course of analysis, a precipitate has been produced by H_2S in acid solution, and it is found to be completely soluble in $(NH_4)_2\ S_x$. What metals may this indicate, and how would one proceed to determine which of these are present?

6. Give in tabulated form the "short process" for the separation of aluminium, iron, manganese and zinc (in absence of chromium and phosphates).

7. How may barium, strontium and calcium be tested for in the filtrate from the precipitate of the iron group produced by $(NH_4)\ OH$ and $(NH_4)_2S$?

8. What are the principal wet reactions of the following metals: Bismuth, chromium, lead, magnesium, potassium, zinc?

9. Mention the best dry tests for the following: Arsenic, barium, calcium, cobalt, manganese, nickel.

10. What are the most common causes of inaccuracy in qualitative analysis, and how may they be avoided?

THIRD YEAR.—(*Practical Chemistry Course.*)

INDUSTRIAL CHEMISTRY.

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

1. Describe the filter press as employed in industrial chemical manufactures.

2. Describe the ordinary vacuum pan, *or* the Yaryan evaporator.

3. Give an outline of one of the principal methods of refrigeration.

4. State what you know about gaseous fuels, their manufacture and use.

5. Give an account of the principal operations employed in the manufacture of sulphuric acid by the new "contact process."

6. What are the more important processes for the commercial production of chlorine? What raw materials are employed in these?

7. What is the principal commercial source of ammonia, and how is it obtained from this source?

8. What are the chief requisites of a good artificial fertilizer? Mention some of the more important artificial fertilizers.

9. How is Portland Cement manufactured?

10. What are the principal kinds of glass, and from what materials are they produced?

THIRD YEAR—(*Practical Chemistry Course*).

ANALYTICAL CHEMISTRY.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. How may phosphorus be estimated volumetrically in iron and steel?

2. How would you estimate the proportion of tungsten in tungsten steels?

3. Give a sketch of the apparatus that you would employ for the estimation of carbon in steel by combustion in oxygen, explaining carefully the use of each part.

4. Give the principal evolution methods for the estimation of sulphur in steel, illustrating by means of chemical equations. Point out any sources of error in the methods.

5. Briefly describe the acetate method for the determination of manganese in iron and steel, calling attention to the principal sources of error.

6. Discuss the relation between the chemical and bacteriological examination of potable waters.

7. How is chlorine determined in potable waters? Explain the significance of the determination.

8. Explain the estimation of organic nitrogen in waters by means of the Kjeldahl method.

9. What is meant by a normal solution? How may a deci-normal solution of sodium carbonate or of sulphuric acid be prepared?

10. Give an outline of the methods of determining any two of the following: Mercury in mercuric chloride, NO_3 in a nitrate; silica in an insoluble silicate.

11. 1 gram of K_2SO_4 is weighed out, dissolved in water, and the SO_4 precipitated in the usual way with $BaCl_2$; the precipitate is filtered out, washed, dried, ignited, and found to weigh 1.327 grm., after deducting the filter-ash. Calculate the theoretical percentage of SO_4 in K_2SO_4, and also the percentage found by the above analysis.

FOURTH YEAR—(*Mining Course*).

ANALYTICAL CHEMISTRY.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

1. Discuss the methods employed to reduce Ferric to Ferrous compounds in the volumetric estimation of Iron. Illustrate by means of equations.

2. In the analysis of a specimen of Chrome Iron Ore the decomposition was effected by means of Sodium Peroxide and the titration carried out by the Iodine method. 0.5 grms. of the ore was used, the solution of chromate obtained was made up to 500 c.c., and 30 c.c. of Thiosulphate solution (1 c.c. = 0.0127 Iodine) were required to discharge the blue colour from 100 c.c. of the chromate solution. What percentage of Cr_2O_2 would the ore yield?

3. Explain carefully the estimation of Copper by precipitation with Ammonium Thiocyanate. Point out any special advantages which the method possesses.

4. Give reasons for the various steps involved in the volumetric determination of Zinc by means of Potassium Ferrocyanide.

5. In the volumetric estimation of Calcium in a slag, 0.50 grm. of the powder was treated in the usual way. 40c.c. of Potassium Permanganate solution (1 c.c. = 0.0146 Fe.), were required to oxydise the Oxalic Acid. What was the percentage of Lime in the slag.

6. How would you determine Antimony electrolytically (*a*) in a sample of Stibnite, or (*b*) in a sample of Antimonial Lead?

7. Under what conditions may Copper and Lead be estimated simultaneously by means of electrolysis?

8. Describe the colorimetric estimation of Copper by means of Potassium Ferrocyanide.

9. How would you determine the Phosphorus in a sample of Steel?

10. In what conditions does Sulphur occur in Coal? Discuss the principles involved in the estimation of total Sulphur, and briefly describe one method for carrying this out.

FOURTH YEAR—(*Chemistry Course*).

MINERAL ANALYSIS.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

(*Answer any ten questions.*)

1. Deduce a formula for a mineral which gave on analysis the following percentage composition:—Silica 35.68, Alumina 5.88, Ferric Oxide 23.70, Ferrous Oxide 3.65, Manganous Oxide 0.81, Lime 29.64, Magnesia 0.35.

2. What constituents are liable to be present in Magnesites? Give concisely a scheme for their determination.

3. Describe the estimation of Titanium (*a*) in an Iron Ore, and (*b*) in an insoluble Silicate.

4. How may Fluorine be estimated in an insoluble Silicate?

5. Discuss the precautions to be taken in the separation of Iron and Manganese by the basic Acetate process.

6. Explain the employment of Standard Solutions of Sodium Thiosulphate in the estimation (*a*) of Chromium, and (*b*) of Copper.

7. How may Nickel and Cobalt be estimated electrolytically? How separated by means of Potassium Nitrite?

8. How would you determine the flash-point of a mineral oil with Abel's apparatus?

9. Explain Lawrence Smith's method for the estimations of Alkalies in insoluble Silicates.

10. How would you determine (*a*) the Copper, and (*b*) the Arsenic in a sample of commercial Copper containing the latter element?

11. What weight of crystallized Sodium Thiosulphate ($Na_2 S_2 O_3 . 5 H_2O$) should be dissolved in water and made up to a litre in order that 1 c.c. of the solution should be equivalent to 0.015 gramme of Copper?

12. Explain carefully the theoretical points involved in the estimation of Zinc by means of a standard solution of Potassium Ferrocyanide.

13. How would you make an analysis of a sample of Coal? Call attention to the principal sources of error.

ELECTRO-CHEMISTRY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

(*Seven questions to be answered.*)

1. How would you measure a current by means of a silver voltameter? What volume of hydrogen at 10°C. and 750 mm. is obtained by passing a current of 3 ampères through a dilute solution of sulphuric acid for an hour?

2. What is meant by osmotic pressure, and how can it be measured? What class of substances give an abnormal value for the osmotic pressure?

3. What are the principal standard cells used? How would you make, and how use one?

4. What is the electro-chemical theory of the action which takes place in charging and discharging a lead accumulator? Draw the discharge curve.

5. Write notes on the Lippmann electrometer, and on transference ratios.

6. 25 c.c. of a normal hydrochloric acid solution exactly neutralize 11.4 c.c. of a potassium hydroxide solution. What is the strength of the latter?

7. How are lead and copper extracted from their ores by electrolysis?

8. Write notes on concentration cells and gas batteries. Calculate the E.M.F. of the battery H (electrolyte) O.

$$\left(\begin{array}{c}(H_2 + O = H_2O + 68,000 \text{ calories}) \\ \frac{d\pi}{d\tau} = -0.0014 \text{ of a volt.}\end{array}\right)$$

PHYSICAL CHEMISTRY.

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

1. What is the Phase Rule? Draw and explain the pressure-temperature curve for sulphur or water.

2. Write a note on the Periodic Law.

3. Deduce Van der Waals's equation. Calculate the value of R in calories in the equation $PV = RT$.

4. Describe carefully the determination of molecular weights by the freezing or boiling-point method.

5. How would you prepare a standard cell, and how compare its E.M.F. with that of an accumulator?

6. Write a note on transference numbers.

7. What thickness of copper would be deposited on a cathode of one square metre surface, by a current of ten ampères flowing for one hour?

8. What are balanced reactions? Deduce the formula for a mono-molecular reaction.

9. Write a note on calalytic reactions.

10. Deduce the formula for the E. M. F. of a reversible cell. Calculate the E.M.F. of the battery *H* (Electrolyte) *Cl*.

$$H + Cl = HCl + 20{,}000 \text{ calories}$$
$$HCl + aq = HClaq + 17{,}000 \text{ calories}$$
$$\frac{d\pi}{d\tau} = -0.000\,85 \text{ volt}$$

CHEMISTRY.

GAS ANALYSIS.

TUESDAY, APRIL 14TH, 1903:—AFTERNOON, 2 TO 5.

1. Discuss some of the precautions one should take when working with gases; as in the collecting of a sample for analysis, the keeping and storing of gases, etc.

2. Describe in some detail how you would determine when the right proportion of air was being supplied to a furnace.

3. How would you determine the percentage composition of the Atmosphere as regards the following constituents:—Oxygen, Nitrogen, Carbon dioxide and water vapour.

4. Describe in detail the analysis of illuminating gas with Hempel's apparatus.

5. If in the above analysis you found the decrease in volume after combustion to be 18 c.c., and 6 c.c. of CO^2 were absorbed by the *KOH*, how many c.c. of methane and of hydrogen were present in the sample of residue taken?

6. Discuss the relative advantages and disadvantages of Orsat's and of Hempel's apparatus for absorbing gases in volumetric gas analysis.

7. A determination of the water vapour in the atmosphere gave the following data:—Volume of air drawn into aspirator 2 litres, weight of water found = 0.0272 gms, Barometer = 765.6 m.m. temp. of air in aspirator = 19°C., outside temp. = 20°C. What is the weight of water in one litre of the moist air?

Tension of Aqueous vapour at 20° = 17.4
" " " 19° = 16.3

8. What effect will a change of 1 degree of temp. have on the volume of 500 c.c. of gas measured over water, will the actual pressure and temperature chosen have any effect on this change of volume?

9. Briefly describe the Kyeldahl method for determining nitrogen.

10. Discuss the burette known as the "compensation burette" where the volume of gas read off gives directly the volume at 760 mm. P and 0°T.

CIVIL ENGINEERING AND APPLIED MECHANICS

THIRD YEAR.

GRAPHICAL STATICS.

DECEMBER, 1902.

(Seven questions only may be attempted, the marks obtainable are attached to each question.

Compression members in both the frame diagram and the stress diagram are to be marked by thick black lines. The stresses need not be tabulated.)

1. A factory roof of the type shown by Figure 1 is loaded as shown, determine the stresses in all the members. (20)

2. Determine all the stresses in the power-house roof shown in Figure 2, when in addition to the loads on the upper chords there are two loads of 4,000 pounds on the lower chords as shown. (25)

3. Determine by the method of sections all the stresses in the truss loaded in the manner shown by Figure 3. (30)

4. A plate girder is loaded with a number of concentrated loads as shown in Fig. 4. Draw the shearing force and bending moment diagrams for the given system of loading and draw a scale for your bending moment diagram. (30)

5. A girder of fifty foot span carries a wall one foot thick and of varying height as shown in Fig. 5. The material of the wall weighs 120 pounds per cubic foot.

Determine the shearing force and bending moment diagrams and mark on your drawing the scales you have used. (40)

6. An overhanging roof is supported on columns and

loaded as shown in the diagram Figure 6. Determine the stresses in the columns and in all the members of the roof truss. (35)

7. A roof having a roller support at one end is dressed by a wind load whose effect may be represented by the forces marked on the diagram Figure 7. Determine the stresses in all the members of the truss. (40)

8. A cast iron channel with inclined sides is supported by a bulb tee iron, a section of the arrangement being shown in Figure 8.

Determine the centre of gravity of the section. (30)

9. A cantilever truss, Fig. 9, is hinged to a wall at its upper extremity and supported below by a bearing which gives a horizontal thrust. Determine the stresses in the members of the frame when loaded as shown. (40)

10. A ship's gangway is loaded in the manner shown by Fig. 10. Determine the stresses in all the members. (40)

11. A lattice work arch having the dimensions shown in Fig. 11 is pin jointed at the supports and carries the system of loading shown in the Figure. Determine the line of resistance which will pass through the pin joints and also through the point where the greatest load intersects the upper chord of the arch. Also determine the horizontal thrust of the arch under the given systems of loading. (55)

THIRD YEAR.

TESTING LABORATORY.

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

(*Six questions only to be attempted.*)

1. Describe one form of extensometer used in determining the alterations in length of a tension specimen before it reaches the yield point and show how you would proceed to calibrate the instrument.

2. What rough tests would you make to find out whether a bar of metal was iron or steel, and how would you confirm your opinion by experiments in the testing laboratory.

3. Show how to determine the moment of resistance of an irregular section graphically, and illustrate your answer by considering the case of a rail section for a street railway.

4. Describe the apparatus in the laboratory for testing to destruction short examples of wire and sketch typical stress strain diagrams for (*a*) steel, (*b*) wrought iron, (*c*) brass, and (*d*) copper.

5. Describe the apparatus used in the laboratory for determining the deflections of large beams supported at each end.

A steel I. beam, 6 inches deep and 60 inches span, was loaded by weights applied at the centre and gave the following deflections:—

Load at centre in pounds.	Deflections in ins.	
2000	.0057	
4000	.0116	
6000	.0173	$I = 56$ in inch units.
8000	.0230	
10000	.0288	

Calculate the value of E and also the greatest stress in the beam for the final load.

6. Describe the construction of one of the torsion testing machines in the laboratory.

Draw a probable stress strain diagram for a solid steel specimen of circular section and also for a thin tube of the same material.

In a test of a specimen of mild steel of diameter 0.47 inches and length 8.00 inches the following results were obtained:—

Twisting moment in inch pounds.	Angle of twist in degrees.
50	0.35
100	0.72
150	1.08
200	1.44
250	1.78

Calculate the value of the modulus of rigidity and the greatest stress in the shaft for the final twisting moment.

7. What tests would you subject a sample of a cement to in order to determine its quality. Give typical results for (*a*) a very good specimen, (*b*) a fair specimen, (*c*) a bad specimen.

8. In testing granular materials, such as cement, brick, stone and the like, in compression, the ends are usually faced with a thin layer of Plaster of Paris or cardboard. Explain why this is done and describe what differences you would expect to get if thin sheets of lead were used instead.

9. Explain how you would test the coefficient of friction of a piece of leather belting.

A leather belt is wrapped round a fixed cast-iron pulley and the ends of the belt hang vertically. Three determinations of the load at which the belt began to slip were made as follows:—

T_1 lbs.	T_2 lbs.
3·5	7.2
5·5	11.5
7·5	14.7

From these values calculate the mean coefficient of friction of the belt.

10. Show how to determine the modulus of rigidity of the wire composing a spring and obtain a formula for it in terms of the dimensions of the spring and the deflection due to a given load.

A steel spring, composed of wire ¼ of an inch in diameter is coiled on a cylindrical surface of mean diameter of 2½ inches and its effective length is 80 inches. The mean deflection for a load of 10 pounds is found to be .155 of an inch. Calculate the value of the modulus of rigidity of the wire.

THIRD AND FOURTH YEARS—(*Civil*).

MUNICIPAL ENGINEERING.

WATER SUPPLY.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

1. Discuss the following:
   (*a*) Fire streams.
   (*b*) The location of hydrants.
   (*c*) The quality of surface water supplies.

2. Sketch, with principal dimensions, a longitudinal section of a joint in a 12 inch cast iron water pipe.

3. Describe a process for coating cast iron water pipes.

4. State the general principles which would guide you in laying out the distributing system for a town of eight or ten thousand inhabitants.

5. Explain the purpose of a distributing reservoir.

6. Make a sketch, with dimensions, showing a vertical section of a slow sand filter-bed.

State the changes which impure water undergoes in passing through the bed, and explain how these changes are effected.

7. What are the principal determinations in a chemical analysis of drinking water? Explain the significance of any two of them.

8. Name the various influences which affect the discharge of streams.

9. A standpipe is to be 30 feet in diameter and 50 feet high. Write a short specification for (*a*) the material to be used, (*b*) the painting. What would be the proper thickness for the plates next to the bottom?

10. *A* is a pumping station.

AC is a pumping main 12 inches in diameter and 20,000 feet long.

B is a distributing reservoir connected to the pumping main at *C* by a 14 inch pipe 4,000 feet long.

The elevation of the pump is	90.00
" " point *C*	100.00
" " water surface in *B*	270.00

If the pump is working under a head of 210 feet, and 2,000 gallons of water per minute are being withdrawn at *C*, find (*a*) the quantity discharged per minute by the pump, (*b*) the pressure at *C*.

NOTE.—*Third Year students may omit either 9 or 10.*

THIRD AND FOURTH YEARS.

STRUCTURAL ENGINEERING.

MONDAY, APRIL 13TH, 1903:—AFTERNOON, 2 TO 5.

(Ten questions only may be attempted.)

1. What steps would you take to thoroughly inspect a finished hollow cylindrical cast iron column?

2. Is it more economical to use a deep or a shallow I beam for a given span? Why?

When a beam is to support a plastered ceiling, what is the greatest allowable deflection?

3. Discuss the effect of excentric loading on columns. A column 7″ square, with a moment of inertia = 40, and area = 4.5 sq.″ will carry 40,000 lbs. if loaded concentrically. What load will it carry if the load be applied at a distance of 2″ from the neutral axis.

4. What are the commonest forms of separators? State their relative advantages?

5. Deduce a formula for pitch of rivets in the top flange of a plate girder, where the load is uniformly distributed and applied directly on the flange.

6. Discuss fully the shrinkage of timber. What defects would be found in badly kiln-dried timber? Why?

7. What points should guide you in selecting any particular species of wood for a given structure.

8. Describe and discuss three different systems of pile-caping. What precautions are to be taken in each system?

(1) As to alignement of piles.

(2) As to cutting off the heads of piles.

(3) As to the position of the piles with regard to the level of continually moist ground.

9. In the same building, on a soil of uniform bearing power, should the load per unit of area on the foundation bed be the same?

(1) Under a brick wall. (Lime mortar.)

(2) Under a stone wall. (Large stones.)

(3) Under a pier supporting tiers of cast iron columns. Give reasons in each case.

10. Distinguish between dead and live loads in buildings.

For what portion of the live load should (1) the floor beams (or joists), (2) the main beams, (3) the columns and (4) the footing, be figured.

(*a*) In an office building?

(*b*) In a theatre?

(*c*) In a storage warehouse?

Give reasons in each case.

11. What should be the relative position of the centre of pressure and centre of base under a footing of an exterior wall?

Discuss the effects of the relative positions of the above points on the stability of the building.

12. In localities where the building laws do not allow the footing courses to project beyond the lot line, what special precautions are to be taken when building side walls on the lot lines?

13. A warehouse, brick wall, 20″ thick weighing 6 tons per lineal foot, and supporting a floor and roof load of 12 tons per lineal foot, is to be built on a soft soil, the safe bearing power of which is only 1½ tons per square foot. The bottom course of the wall is built of stone blocks 2′ 6″ wide.

Design an economical concrete and steel beam footing making a dimensioned sketch of cross-section of same.

Depth of excavation not taken in consideration. Cost of Concrete, in place, $3.60 a cubic yard. Cost of steel beams in place 2¾c. a pound.

The following steel beams are available to choose from:—

8″	I	18	lbs.	Flange	4.″	Moment R.	= 14.2
9″	I	21	“	“	4.33″	“	+ 18.9
10″	I	25	“	“	4.66″	“	= 24.4
		30	“	“	4.8″	“	= 26.8
		35	“	“	4.9″	“	= 29.3
		40	“	“	5.09″	“	= 31.7

12″ I	31½	"	5.0″	"	= 36.
	35	"	5.08″	"	= 38.
	40	"	5.25″	"	= 44.8
	45	"	5.36″	"	= 47.6
15″ I	42	"	5.5″	"	= 58.6
	45	"	5.55″	"	= 60.8
	50	"	5.64″	"	= 64.5
	55	"	5.74″	"	= 68.1

THIRD AND FOURTH YEARS.

THEORY OF STRUCTURES.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

Candidates may attempt eight questions only.

1. Define generally the meanings of the terms stress, strain, modulus of elasticity, limit of elasticity, and plasticity, and show what your definitions mean when applied to the case of a bar subjected to gradually increasing tensile stress until it breaks.

2. Prove that the work which can be stored up in a member of uniform section under simple tension or simple compression is $f^2 \mid 2E$ per unit volume, where f is the allowable stress and E is the modulus of elasticity.

A steel eye-bar 30 feet long, 8 inches broad and 1¼ inches thick is stretched .19 of an inch by a load of 168,000 pounds applied axially. Find the intensity of stress on the cross section, the value of E and the amount of stored up energy in the member.

3. Prove that a beam subjected to transverse loading has a moment of resistance (M) expressed by the formula

$$M = \frac{p}{y} I$$

where p is the greatest allowable stress at the distance y from the neutral axis, and I is the moment of inertia (second moment of area) of the section.

Determine the moment of resistance of the built up section shown up in Figure 1; (*a*) about the axis AB, (*b*) or about the axis CD.

4. State the conditions of equilibrium for a retaining wall or reservoir dam, and discuss the three cases of $> = < \frac{1}{6}$. Find the stress at the extreme edges of a joint AB of the dam shown by Figure II; (*a*) when the reservoir is empty, (*b*) when it is full of water. The weight of the masonry may be assumed to be 128 pounds per cubic foot.

5. Prove the Rankine-Gordon formula for the safe load on a column in the form

$$\frac{W}{A} = \frac{f}{1 + a\frac{l^2}{r^2}}$$

and state what assumption is made in your proof. Explain the connection between this formula and a straight line formula of the general form.

$$\frac{W}{A} = b - c\frac{l}{r}$$

6. Show that the twisting moment which can be transmitted by a hollow shaft is expressed by the formula

$$T = \frac{\pi}{16} f \frac{d_1^4 - d}{d^1}$$

where f is the allowable stress, d_1 is the external diameter and d_2 is the internal diameter of the shaft.

Find the twisting moment which can be transmitted by a hollow shaft 16 inches in diameter with an 8 inch hole running through it, if the allowable stress is 12,000 pounds per square inch.

7. Prove that the horse-power which can be transmitter by a solid shaft of radius r when the allowable stress is q lbs. per square inch is given by the formula

$$HP = cq\ N\ r^3$$

where N is the number of revolutions per minute and c is a constant.

Determine the value of the constant and calculate the horse power which can be transmitted by a shaft 4 inches in diameter when turning at the rate of 200

revolutions per minute, if the allowable stress is 12,000 pounds per square inch.

8. Show that the defection (z), the slope (θ) and the bending moment (M) at any point of a beam can be expressed approximately by the relations

$$\frac{d^2z}{dx^2} = \frac{d\theta}{dx} = \frac{M}{EI}$$

and explain what are the approximations made.

From these relations show that the slope at the ends of a beam of length l uniformly loaded with w lbs. per foot run and supported at both ends is given by the expression $\frac{wl^3}{24\ EI}$ and the deflection at the centre by the expression $\frac{5}{384}\frac{wl^4}{EI}$

9. Show that a beam with ends fixed horizontally and loaded by a central weight W is subjected to a bending moment of $\frac{Wl}{8}$ in numerical measure at the the centre and at the ends.

Also show that the slope at ¼ span is $\frac{Wl^2}{64\ EI}$

10. If a plate of uniform thickness be subjected to unit stresses p_1 and p_2 acting at right angles, prove that the stress on any plane whose normal is inclined at an angle a has a normal component of $\frac{p + p}{2}$ and a component $\frac{p_1 - p_2}{2}$ inclined at an angle $2a$.

The principle unit stresses at a point of a strained solid are a tension of 4 tons per square inch and a compression of 1 ton per square inch.

Find the resultant intensity of stress on a plane inclined at 60°, also find the position of the plane upon which the stress is wholly a shear and determine the magnitude of this shear.

11. Obtain a formula for the simple equivalent twisting moment on a shaft when exposed to uniform twisting and bending stress.

Calculate the diameter of a shaft exposed to a twisting moment of 90,000 inch pounds and a bending moment of 120,000 inch pounds when the allowable stress is 10,000 pounds per square inch.

12. What is meant by a continuous girder. Prove that for a continuous girder of two spans loaded uniformly the centre prop carries five-eights of the total load. Make diagrams to scale of the shearing force and bending moments for a two span continuous girder when each span is 40 feet.

13. Deduce a general expression for the Theorem of three moments.

A continuous girder of three equal spans is uniformly loaded. By how much must the two intermediate supports be depressed to produce the same reactions at all the supports.

HYDRAULICS.

WEDNESDAY, DECEMBER 17TH:—MORNING, 9 TO 1.

(Candidates may attempt all or any of the questions.)

1. Deduce an expression for the time required to empty or fill a canal lock.

The horizontal section of a lock chamber has an area of 12,000 square feet and the difference of level between the surface of the water in the lock and the upper reach is 9 feet. Each leaf of the gate is supplied with one sluice, which is completely submerged, and the water is levelled up in 4 minutes. Determine the proper area of the sluice opening, the coefficient of discharge being .625.

2. Explain what is meant by "loss of energy in shock," and deduce an expression for the loss in the case of a small pipe discharging into a larger pipe across an abrupt change of section.

A 3½ in. pipe discharges into a 7 in. pipe, the quantity of flow being 1,925 cubic feet per hour. Find the loss in shock at the change of section.

3. Water from a reservoir flows through a triangular notch. Determine the discharge per second.

If the supply entering the reservoir ceases and if the horizontal sectional area of the reservoir is 26,400 sq. ft., in what time will the depth of water in a 90° notch fall from 4 ft. to 1 ft., the coefficient of discharge being .617.

4. Write down an expression for the discharge over a weir and describe the modifications introduced by Francis.

5. A stream, 100 ft. wide and 4 ft. deep, has a velocity of 4 ft. per second. Find the height of the weir which will increase the depth by 25 p.c.

5. Give a short description of Darcy's experiments.

6. Water flows steadily through a pipe of constant diameter. Deduce an expression for the loss of head in frictional resistance.

A pipe, 5,000 ft. long, discharges 7,200 gallons per minute and the loss of head in friction is 80 ft. If the coefficient of friction is .007, find the diameter.

7. The water surface of a reservoir is 400 ft. above datum and is connected by a 4 in. pipe, 1,000 ft. long, with a turbine 100 ft. above datum. Determine the velocity of the water in the pipe at which the power obtained from the turbine would be a maximum and, if the efficiency of the turbine is 85 p.c., determine the power, f being .006.

8. Three reservoirs at different levels are connected by a branched pipe. Given h_1, h_2, h_3, r_1, r_2, r_3, show how to determine Q_1, Q_2, Q_3, v_1, v_2, v_3, and the height of the discharge above datum.

9. Write down a general expression giving the velocity of flow in an open channel in terms of the mean hydraulic depth and the slope, assuming the flow to be steady, and deduce the conditions (*a*) for the maximum velocity of flow; (*b*) for the maximum discharge.

A circular aqueduct, faced with brick, has a diameter of 9 ft. and a slope of 15 in 10,000. The water line subtends an angle of 240° at the centre. Taking $b = .00006$, determine the quantity of water conveyed in gallons per day.

10. Describe a Borda turbine and show that the best speed of such turbine is given by the relation

$$u\, v_1 \cos\gamma = gH$$

A Borda turbine, of 5 ft. mean diameter and 4 ft. depth, works under a total head of 20 ft. The direction of the jet before impact is inclined to 30° to the horizon and the angle of exit is 20°. The jet delivers 3 cubic feet of water per second and $V_2 = u$. Find (*a*) the best speed of the turbine in revolutions per minute, (*b*) the inlet lip angle and the hydraulic efficiency. Also, if the actual efficiency of the turbine is 75 p.c., find its power.

11. A series of curved vanes in the form of arcs of circles subtending an angle of 60° at the centre and following each other at short intervals, receive without shock at the edge a stream of water of 11.52 sq. in. area, flowing at the rate of 32 ft. per second, which drives the vanes with a velocity of 12 ft. per second in a direction making an angle of 60° with the receiving edge. Find the pressure on a vane and the useful work done. Also find the direction and magnitude of the actual velocity of the water as it leaves the vane.

12. Show how to determine the useful work done by a centrifugal turbine.

B.Sc. EXAMINATION.

HYDRAULICS, II.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

(Candidates may answer eight questions only.)

1. Prove from first principles that the useful work done by a jet of water impinging perpendicularly upon a flat vane moving in the same direction, is given by the formula

$$\frac{w}{g} A u (v_1 - u)^2$$

where v_1 = velocity of the impinging jet

u = velocity of the vane.

Deduce an expression for the useful work when there

are a series of vanes moving in the line of the jet's motion.

2. Point out the essential difference between reaction and impulse turbines and between downward flow and radial flow turbines. Show how to determine the actual path of a fluid particle between the inlet and outlet surfaces of a turbine.

3. Deduce the expression $\frac{wQ}{g}\left(v^1_w u_1 - v''_w u''_2\right)$ for the useful work done by the water in passing between the inlet and outlet surfaces of a turbine.

4. Deduce the expression $uv_1 \cos\gamma$ for the best speed of a Borda turbine.

A Borda turbine of 5 1-11 feet mean diameter, is found to work at the best advantage when making 120 revolutions per minute.

The outlet lip angle is 2 cosec $^{-1}.8$ and the direction of the inflowing water is inclined at 30° to the vertical.

If the hydraulic efficiency is .9, find the total head under which the turbine works, assuming $u = V_2$.

5. In the preceding example, if the hydraulic resistances are to be taken into consideration and if $f_2 = f = \frac{1}{9}$; find the total loss of head.

6. In a downward flow impulse turbine of $3\frac{9}{11}$ feet mean diameter, the lip angles are vertical at the inlet ($a = 90°$) and inclined at 60° to the vertical at the outlet. The turbine passes 11 cub. ft. of water per second.

The direction of the water on entering the wheel makes an angle of 60° with the vertical and the total head over the outlet is 84 feet. Find the number of revolutions per minute, the efficiency and the useful work done, disregarding hydraulic resistances. $v''_w = o$.

7. What are the fundamental considerations which govern the design of a water wheel?

A breast wheel of 28 feet in diameter receives at a point 60° from the lowest point of the wheel, which makes 5 revolutions per minute. The total available fall is 11 feet and the direction of the impinging water

makes an angle of 30° with the wheel's periphery. Find the mechanical effort and the best position of the sluice.

8. In a centrifugal pump deduce the relation

$$2gH_a = u\ V + 2v_s\left(v''_w - v_s\right) - v_d^2 - 2gh_r - 2v_1u_1\cos\gamma$$

9. A centrifugal pump, of 63 inches diameter, makes 120 revolutions per minute and discharges 22 cubic feet of water per second. The radial velocity of flow (v''_r) at outlet is 6 feet per second. The lip angle at outlet is $\cot^{-1}\frac{4}{3}$ and the velocities of flow in the volute and in the 24 inch discharge pipe are the same. Disregarding hydraulic resistances, find the actual lift and the efficiency. If the pump has six blades, each of ¾ inch in thickness, find the outlet breadth of the wheel.

10. Explain what advantages are gained by adding a whirlpool chamber to a centrifugal pump.

If a 7 foot whirlpool chamber is added to the pump in the preceding example, determine the corresponding gain of head in this chamber and the actual gain of head in the volute.

11. Prove that the difference of head H between the inlet and outlet surfaces of a turbine wheel can be expressed in terms of velocities of the water and the wheel in the form

$$H = \frac{V_2^2 - V_1^2}{2g} + \frac{u_1^2 - u_2^2}{2g}$$

Hence show, in the case of an inward flow turbine, with uniform radial flow that if the velocity v is radial and a is large, the expression reduces to

$$H = \frac{u_1^2}{2g}$$

12. In an outflow turbine of the impulse type the lip angles at inlet and outlet are equal. Assuming that $u_2 = V_2$ show that the efficiency of the turbine is equal to

$$1 - \left(\frac{r_2}{r_1}\right)^2$$

FOURTH YEAR.

HYDRAULIC MACHINERY.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

Candidates may attempt seven questions only.

NOTE.—(*The answers to the questions should be, as far as possible, illustrated by good sketches, for which a proportion of the marks will be allowed.*)

1. Describe one form of accumulator for obtaining water under very high pressures. An intensifying accumulator is worked from a water-supply service giving a pressure of 125 pounds per square inch. The smaller diameter of the ram of such an accumulator is 4 inches and the higher pressure is to be 5000 pounds per square inch. Calculate the larger diameter of the ram neglecting the loss due to the cup leathers. What energy can be stored up in the machine if it has an effective stroke of 5 feet?

2. Describe one form of rotary hydraulic engine worked from a high pressure main, and point out in what way it differs in construction and action from a steam engine of the ordinary reciprocating type.

3. Describe one form of portable hydraulic riveter. Draw a probable indicator diagram for the machine, and account for the peculiarities of form which it presents. Also briefly describe the special features of advantage which this mode of riveting possesses.

4. Describe one form of impulse turbine of modern type and point out its special advantages over turbines of the pressure type.

5. The speed of a turbine may be regulated by (*a*) throttling the head, (*b*) varying the openings between the guide passages simultaneously, (*c*) closing some of the guide passages.

Give instances of each method of regulation and discuss their relative advantages and disadvantages.

6. An inward flow turbine of the Thomson type is to work under a nett head of 36 feet and the supply of water is 1,500 cubic feet per minute. Assuming the

radial velocity of the water through the wheel as 6 feet per second, calculate the dimensions of the wheel and the angles of the blades at inlet and outlet respectively.

7. What essential difference is there between the governing machanism for a steam engine and that for a turbine.

Illustrate your answer by reference to the case of a turbine having an hydraulic form of governor.

8. Describe two separate devices which have been used for equalizing the work done by the steam cylinders in a direct acting pumping engine.

9. Describe the principal hydraulic features of a power station of modern type operating under a head of not more than forty feet.

10. Describe the apparatus used on some locomotive engine tenders for picking up water while running. If the lift is 9 feet and the coefficient of hydraulic resistance is 0.6, calculate the speed at which the apparatus will begin to supply water to the tender.

11. An hydraulic engine has three single acting cylinders, 6 inches in diameter and 8 inches stroke, it is supplied with water at a pressure of 700 pounds per square inch, and, neglecting the effect of the length of the connecting rod, the inertia of its reciprocating parts is such that at the beginning of the stroke, the effective working pressure is reduced to 450 pounds, while at the position of mid-travel of the piston the effect of fluid friction is to cause a loss of 500 pounds per square inch. Draw the indicator diagram and find the mean effective pressure. Also find the horse power exerted when the engine makes 75 revolutions per minute.

FOURTH YEAR.

HYDRAULIC LABORATORY.

DECEMBER, 1903.

Candidates are to attempt *five* questions only. A proportion of marks will be awarded for good sketches.

1. Describe by aid of sketches the arrangements used for determining the coefficient of discharge of a rect-

angular notch or weir and obtain a formula for the discharge. Deduce the value of the coefficient of discharge from the following data obtained from a sharp edged rectangular weir one foot in breath.

Mean head at hook gauges	= 1.653 inches.
Total discharge	= 675.4 gallons.
Total time of discharge	= 629 seconds.

2. Describe the arrangements used in the laboratory for testing the performance of a Pelton wheel. In a test of the large Pelton wheel in the laboratory under a head of 230 feet the total number of revolutions was 3641 in 8 minutes 26 seconds and the discharge was 668 gallons. The mean load on the brake was 54.3 pounds, the brake wheel was 18 inches in diameter and the rope forming the brake was ⅜ inches in diameter. Calculate the horse-power supplied, the horse-power given out on the rim of the brake wheel and the efficiency.

3. Describe the construction and action of a Venturimeter, and obtain a formula for the flow through it per second. In a test of the Venturimeter in the laboratory the following data were obtained:—

Time—Minutes,	Pressures, Upstream gauge in pounds.	Pressures, Centre vacuum gauge in inches of mercury.
1	20	21.2
3	20.5	21.3
5	20.5	21.9
7	19.5	20.8
9	21.0	22.0
Total time of run		9 minutes 14 seconds.
Total discharge		204.4 gallons.
Diameter of meter at inflow		1.63 inches.
" " at throat		.380 inches.

Calculate the coefficient of the meter.

4. State the laws of friction for liquids against solid surfaces and deduce an expression for the coefficient of friction for a liquid flowing through a pipe in terms of the dimensions of the pipe and the velocity. In an experimental pipe in the laboratory, 72 inches in length and ⅜ inches in diameter, the mean heads at the upstream and down-stream gauges were 9.97 and 2.59

inches of mercury respectively, and the discharge obtained during a period of 305.6 seconds was 3904.2 cubic inches of water. Assuming that the friction varies as the nth power of the velocity n being equal to 1.73. Calculate the coefficient of friction.

5. Describe the arrangements in the laboratory for testing the efficiency of hydraulic rams.

In a test of the Rife hydraulic ram in the laboratory the following data were obtained:—

Head of water on ram	6.0 feet.
Total height to which discharge water was raised	23.9 feet.
Total quantity of water supplied	= 13.8 cubic feet.
" discharge	= 141 pounds.
" time of run	= 10 minutes.

Calculate the horse-power supplied, the horse-power given out and the efficiency.

6. Describe the apparatus in the laboratory used for impact experiments on vanes and like surfaces.

In an experiment upon a rough hemispherical vane the following data were obtained:—

Orifice—

Diameter	½ inch.
Coefficient of discharge	= .61
Coefficient of velocity	= .98
Head over orifice	= 20 feet.

Vane—

Horizontal distance from orifice	= 36 inches.
Vertical distance below orifice	= 1.38 "

Balance—

Horizontal arm	= 24 inches.
Vertical arm	= 36 inches.
Balance weight in pan	= 4 pounds 6 ounces.

From these figures calculate the efficiency of the vane as compared with the theoretical type.

7. Describe the arrangement of the gear used for testing the Gilkes radial out-flow turbine used in the laboratory. Find the horse-power supplied, the horse-power developed at the brake wheel and the efficiency of the turbine from the figures obtained below in an experimental run.

Mean pressure head on wheel	39.3	pounds.
Total revolutions	2130.	
" discharge	745	gallons.
" time of run	315	seconds.
Mean load on the brake	36.7	pounds.
Diameter of brake wheel	18.1	inches.
Diameter of rope on brake wheel	0.5	"
Height of pressure gauge above inflow	29	"

B.Sc. EXAMINATION.

THEORY OF STRUCTURES.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.30.

PART I.

1. A roof over the stage of a theatre is of the form shown by Fig. 1, and in addition to the usual weights of the roof covering on the top chord, there is an additional load on the bottom chord due to the weight of the scenery, etc. The loads are represented by concentrated weights at the joints in the diagram. Determine the stresses in all the members.

2. A pin-connected bridge has stringers spaced 8′ 0″ apart. Design the flooring for this bridge for a maximum axle concentration of 54,000 pounds, which is assumed to be distributed over three ties. The safe-working stress for the ties may be taken as 1,800 pounds per square inch.

3. A pin-connected *A* truss, of the dimensions shown by Fig. 2, is to be designed for Cooper's standard loading *E*45. Determine the live load stresses and the impact stresses on all the members of the frame.

4. A masonry arch is subjected to the system of loading shown by Fig. 3. Determine the least uniform thickness of the arch ring, so that a line of resistance shall be in the centre half.

5. A stringer for a single line railway bridge is 30 feet long and is to be designed for a live load of 4,000 pounds per foot run of stringer. The estimated weight of the stringer is 2,500 pounds. Determine the principal dimensions of the stringer and design as much of it as you are able in the time allowed.

6. Design the bearing plates for the lower end of the inclined post of a truss, shown in Fig. 4, when the total compression load is 650,000 pounds and the pin is 6½ inches in diameter.

PART II.—2 TO 5.30 P.M.

7. A truss of 210 foot span, Fig. 5, is subjected to a moving wind load which is equivalent to 500 pounds per foot run of the bottom chord. Determine the stresses in the main lower chords and in the lateral bracing.

8. In the previous question, if the stringers are 8′ 0″ feet part, design the wind bracing in the end panel, and show the connections to the main members and to the stringers.

9. The truss shown by Fig. 5 is subjected to a live load of 5,500 pounds per foot run. Determine which of the members are subject to reversion and the variation of the stress.

10. A masonry dam, of the section shown by Fig. 6, is composed of masonry weighing 120 lbs. per cubic foot. Determine the line of resistance of the dam (1) when subjected to its own weight, (2) when water is up to the level of the top of the dam.

11. A cantilever truss, Fig. 7, is subjected to a live load of 3,600 pounds per foot run. Determine the stresses in all the web members and calculate the impact allowance for each member using the formula

$$\text{Impact percentage} \frac{30000}{L + 300}$$

where L is the length of the bridge loaded to give the maximum stress for the members in question.

13. A three-hinged truss, Fig. 8, has a load of 4 tons at each panel point. Determine the stresses in every member.

If a load of 4 tons is concentrated at each of the points A and B, find the stresses developed in the members x; also find the position of the load on each side of the central hinge, which will produce no stress in the members marked y.

B.Sc. EXAMINATION.

THEORY OF STRUCTURES.

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

(NOTE.—*At least three examples must be selected from each section.*)

SECTION I.

1. Prove that in the case of a beam loaded transversely, the bending moment (M), the shear (S) and the load W at every place, are connected by the relations

$$\frac{d^2M}{dx^2} = \frac{dS}{dx} = \omega$$

and illustrate your answer by reference to the case of a beam supported at each end and loaded uniformly.

2. Show that the distribution of shearing stress over the cross section of a beam is expressed by the equation

$$q = \frac{S}{Iz_0} \int_{y}^{y_1} yz\,dt$$

and deduce the ratio of the maximum shear stress to the mean shear stress for a beam of rectangular section.

3. Show that if the plane of bending of a beam is inclined at θ to the principal axis, the neutral axis is inclined at an angle ϕ given by the equation

$$\tan \phi = \frac{I_1}{I_2} \tan \theta.$$

and the moment of resistance M is given by the expression

$$M = p \left\{ \frac{Y \cos \theta}{I_1} + \frac{X \sin \theta}{I_2} \right\} -$$

where X and Y are co-ordinates of the extreme point.

Calculate the value of ϕ and M for the case of a rectangular pine beam, 12 inches deep and 6 inches wide, when the plane of bending is inclined at 30° and the allowable stress is 900 pounds per square inch.

4. Prove that a long thin pillar with free ends will collapse when the load W reaches the value

$$\frac{\pi^2}{l^2} EI,$$

and show what effect fixing the ends will have on the load causing collapse.

Point out the application of the formulae in determining the value of the constant in the Rankine Gordon formula for the strength of columns.

5. Write down the general equations connecting stress and strain for an elastic body, and determine the particular relations between them in the case of a thick cylinder with ends free. Also show that the hoop stress p_v in a thick cylinder is connected to the radial x at a radius r by the relation

$$p_y = \frac{d}{dr}(p_x r) -$$

6. Show that the rigidity modulus (C) and the modulus of cubical compressibility (D), are related to Young's modulus E by the formulae

$$C = \frac{1}{2} \frac{\sigma}{\sigma + 1} E$$

$$D = \frac{\sigma}{3(\sigma - 2)} E$$

where σ is Poisson's ratio.

Hence show that σ can be expressed in terms of C and D in the form

$$\sigma = \frac{2(C + 3D)}{3D - 2C}$$

7. Prove the theorem of three moments for the case where the loads on each span are uniform over the span.

Apply your results to determine the reactions at all the supports and the bending moment over the central

support for a continuous girder of 2 spans, each of 50 feet length, and one of which is loaded with 2 tons per foot run and the other with 1 ton per foot run.

SECTION II.

8. The cables for a suspension bridge of 210 feet clear span are suspended from piers which are 25 feet and 4 feet respectively above the lowest point of the cables.

The top of the lowest pier is anchored by a backstay applied at 60° to the vertical while the higher pier is anchored by a backstay inclined at 45° to the vertical. Determine (*a*) the length of the cable between the piers, (*b*) the horizontal pull on the cable, (*c*) the tensions in the cable at the tops of the piers when the load on each cable is half a ton per linear foot of span.

9. For an arched rib of uniform section and hinged at both ends deduce the conditions

$$(DE.\ EF.\ ds) = 0$$

10. A flat arched rib with free ends in the form of a parabola of 80 feet span and 20 feet rise carries a load of 10 tons at 20 feet from the support measured horizontally. Find the horizontal thrust, also find the axial thrust just above and below the point at which the weight is concentrated, also find the maximum bending moment to which the rib is subjected.

11. Show how the results will be affected in the example of the preceding question when both ends are fixed.

12. Explain the advantages of the auxiliary truss of a suspension bridge.

The platform of a suspension bridge of 300 feet span is suspended by vertical rods spaced 10 feet apart and the platform is also provided with an auxiliary truss. Determine the pull on a suspender when one half the bridge carries a line load of half a ton per foot run. Also find the maximum bending moment and maximum shear to which the auxiliary truss is subjected.

13. Show that the bending moment at any point of an arched rib is equal to the product of the horizontal thrust by the vertical distance between the axis of the rib and the linear arch at the point in question.

14. State the theory of the transformed catenary.

DESCRIPTIVE GEOMETRY

FIRST YEAR.

DESCRIPTIVE GEOMETRY—PROJECTIONS.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

1. A *triangle ABC*, *AB* 2½″, *BC* 2″, *AC* 3¼″ has *A* ½″ above H.P. and 1½″ in front of V.P., *B* on the H.P. and ½″ in front of V.P. and *C* 1½″ above H.P.

Show plan and elevation of the triangle, and the H.T. and V.T. of the plane of the figure.

2. A *rectangle* 2½″ × 1½″ has its long edges parallel to the V.P. and at 45° to the H.P. The nearest long edge to the V.P. is ½″ in front of V.P. The short edges of the figure are at 25° to the V.P. Show plan and elevation of the figure.

3. A right circular *cone* 2″ base rests on the H.P. and has its apex in the V.P. while its axis, 3″ long, is at 65° to the H.P. and is in a plane perpendicular to the planes of projection. Show the plan and elevation of the solid.

4. A square right *pyramid*, edge of base 1½″, axis 2½″ has one diagonal of its base horizontal and the other at 40° to the H.P. and 20° to the V.P. Show plan and elevation of the solid.

5. A right circular *cylinder* has its axis 3½″ long parallel to both planes of projection and 2″ from each of them. Diam. of end 1½″. A right *prism* with end an equilateral triangle, 1¾″ side, stands vertically on H.P. and is 3½″ high. The rectangular face nearest the V.P. is at 25° to the V.P. and the axis of the prism is 1¾″ from the V.P. Show the development of the surfaces of both solids marking the lines of intersection.

6. A right rectangular *prism* 3″ × 1½″ × 1″ has its long edges at 40° to the V.P. and one of them in the H.P. and a diagonal of the end is horizontal. Show

the plan and elevation of this solid and the true form of section by a plane perpendicular to the H.P. and at 30° to the axis of the solid and cutting it in a point 1″ from the end of the solid.

7. An equilateral *triangle* 1¾″ edge with one edge at 45° to *XY* is the plan of a triangle *ABC*. The heights of *A*, *B*, *C*, above the H.P. are 2″, ¼″ and ¾″ respectively. Find the true form by rabatment.

SECOND YEAR.

DESCRIPTIVE GEOMETRY.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

1. A *sphere* of 2½″ diam. rests on the H.P. and is cut by a plane whose *VT* and *HT* make angles of 60° and 45° respectively with the *XY*, and its *HT* is one inch from the plan of the centre of the sphere. Draw the plan and elevation of the section.

2. Draw a plan and elevation of a regular tetrahedron of 2″ edge when three angular points are 1″, 1½″ and 2¼″ respectively above the H.P.

3. A sphere 1¼ in. diam. has its centre 1 in. from both planes of projection. A straight line whose plan is ¾ in. from the plan of the centre of the sphere and inclined to the *XY* at 30° has its elevation inclined to the *XY* at 60°. Show the traces of the planes containing the given line and touching the given sphere.

4. The height of a regular hexagonal pyramid is 3″ and the edge of its base 1″. Find its plan when the base is contained in a plane inclined at 45° to the H.P. and 60° to the V.P. and one triangular face makes an angle of 75° with the H.P.

5. A cylinder has for its *VT* a circle 1½ in. diam. whose centre is 1 in. above *XY*. Immediately opposite this circle a second circle, on the H.P., having a diam. 1½ in. and centre 1¼ in. from *XY*, is the H.T. of a second cylinder.

The elevation of a generator of the first cylinder has an inclination of 30° to *XY* and the plan of the same generator is at 45° to *XY*.

The elevation of a generator of the second cylinder is at 60° to *XY* and its plan is at 15° to *XY*. Show the plan and elevation of the lines of intersection of their surfaces.

6. A square prism faces 2″ wide by 3″ high is surmounted by a right cylinder 3″ diam. and ½″ high. The axes of the solids are vertical and coincide in plan. The faces of the prism are at 45° to the V.P. Find the shadows cast on the prism and on the H.P., and the V.P. by the solids when the rays are directed towards the V.P. and their plans and elevations are at 60° to the *XY*. The centre of the base of the prism is 2″ from *XY*.

7. When the inclinations of two of the axes of an axometric projection are at 30° and 45° respectively, find the inclination of the 3rd axis and project a cube of 3″ edge having these inclinations for its edges.

THIRD YEAR—(*Civil Engineering Course*).

DESCRIPTIVE GEOMETRY.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.30.

1. Plot the following notes on a Mercator's projection, taking the equatorial radius as 3962.8 miles and using a scale of 500 miles to the inch. The latitude is south and the longitude east.

35°	117° 30′	15°	135° 30′	39°	146° 30′
33°	115°	16° 30′	138°	38°	141°
32° 30′	115° 45′	17° 45′	141°	33° 30′	137° 30′
27°	113° 30′	10° 30′	142° 30′	35°	136°
22° 30′	113° 30′	19°	146° 30′	32°	133°
20°	120°	25° 30′	153°	31° 30′	129°
14°	127°	28°	153° 30′	33°	125°
15°	129°	32° 30′	152° 30′	34°	123° 30′
11° 30′	151° 30′	37° 30′	149° 30′	34°	120°
12° 30′	137°				

2. Draw a perspective projection from the accompanying plan. Place the centre line of the object at 30° to the picture plane. Choose the positions of eye and picture plane so as to show the object to the best advantage.

5. The sun (decl. N. 10°) was observed in latitude 45° N. when his hour angle was 3^h. Determine his altitude and azimuth graphically.

ELECTRICAL ENGINEERING

SECOND YEAR.

ELECTRICAL ENGINEERING.

PHYSICAL LABORATORY.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

1. A bar magnet is placed in the meridian with its South pole pointing North. The neutral points are found to be 31.5 cms. from the centre of the magnet. The magnet is 16 cms. long. Find its magnetic moment taking H as .150.

2. How does the compass-box variometer measure the variation in the horizontal component?

3. How would you determine the moment of a magnet by (*a*) the torsion balance, (*b*) the deflection method using a telescope and scale.

4. The deflection on a differential galvanometer is 10 divisions to the right for a resistance of 125 ohms and 17 to the left for a resistance of 124 ohms. Find the sensitiveness of the galvanometer, and the value of the unknown resistance. How would you test the ratio coils.

5. State Joule's law, and describe the continuous-flow method of measuring Joule's equivalent.

6. Ten volts through a Megohm gave a deflection on a galvanometer of 200 scale divisions. One hundred volts through the insulation of cotton covered twin wire gave 16 divisions. The resistance of the galvanometer was found to be 5000 ohms. Find the insulation resistance.

7. Describe the Carey-Foster method of comparing resistances.

8. A 10 wire potentiometer is connected with a 2 volt storage cell. If each wire is 1 meter long where would a Clark cell balance. Show a diagram of connections. (Clark cell = 1.433 volts.)

Show what effect on the balance point the following changes would produce; a Megohm put in series with the galvanometer and Clark cell, a diminution of current from the storage cell, and a drop in temperature of the Clark cell.

9. A resistance coil is measured at 20° and found to be 1.023 ohms. Calculate the shunt necessary to bring it to 1 ohm even at 16° taking the temperature coefficient of the wire as .00025.

THIRD YEAR.

ELECTRICAL AND MECHANICAL ENGINEERING.

CONTINUOUS CURRENT MACHINERY.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

1. The data and dimensions of the magnetic circuit of a continuous current dynamo are given (Fig. 1). How many ampere turns per pole are required to produce a flux of 11 megalines through the air gap. Coefficient of leakage 1.15.

FIG. 1.

2. A 15 kilowatt, 4 pole, 250 volt dynamo with series wound armature has 640 conductors in 40 slots. A lead of 9 degrees is given to the brushes at full load output.

How many demagnetizing turns are thereby produced per pair of poles?

3. Discuss fully the losses occurring in continuous current machines and what is usually done to control such losses?

4. A 12.5 kilowatt, 125 volt, 1200 r.p.m. generator has an armature resistance of .015 ohms at 60 degrees Fah. Resistance of brush contact .005 ohms at same temperature. The bearing friction and windage loss at rated speed is 250 watts. Armature iron loss 135 watts, Field loss 225 watts. Calculate the efficiency at 25, 50, 75 and 100 per cent. full load at 60 degrees Fah.

If after an 8 hours' run full load the temperature rise in armature and field is 55 degrees Fah. Correct the full load efficiency.

5. Find an expression for the true density of magnetic flux in the teeth of a slotted armature, if the total flux in the air gap is known, also dimensions of tooth, slot, and air spaces given.

6. Discuss fully method used for predetermining the pressure drop under load in designing continuous current dynamos?

7. A motor is tested with a rope brake on a 2 feet diameter wheel. When running at 1100 r.p.m., the scale reading was 50 lbs., with 1 lb. hanging free on the other side of the rope. The motor input is 100 amperes at 110 volts. What is the efficiency?

8. State how you would test a continuous current generator for capacity, efficiency and regulation?

How would you separate eddy and hysteresis losses in the armature?

9. Draw an end view and development for a 4 pole drum armature with parallel grouping of circuits, there being 48 conductors and 34 commutator bars?

THIRD YEAR ELECTRICAL ENGINEERING.

EXPERIMENTAL PHYSICS.

ELECTRICAL MEASUREMENTS.

MONDAY, APRIL 13TH, 1903:—AFTERNOON, 2 TO 5.

1. Describe a form of potentiometer suitable for comparing small electromotive forces.

Describe in detail, the experimental arrangements required to calibrate accurately a Weston millivoltmeter of range 50 millivolts and internal resistance 1 ohm.

2. Explain how to obtain the figure of merit of a high resistance astatic galvanometer. How is the sensibility varied by the control magnet? What relations exist between the sensibility of the galvanometer and the period of swing of the needle?

3. Give the simple theory and arrangement of Lord Rayleigh's current balance in his determination of the electrochemical equivalent of silver.

4. How could you construct and test standard resistances of 1 ohm and .001 ohm respectively?

5. Show how to determine the constant of a ballistic galvanometer:

(*a*) By induced currents;

(*b*) By discharge of a condenser.

6. Given a plate of transformer iron, explain clearly how you would proceed to test its magnetic qualities.

7. Explain clearly why the area of the hysteresis loop in iron is a measure of the energy dissipated per cycle per c.c.

Calculate the horse power wasted in hysteresis in passing 1 ton of iron through 60 cycles per second.

Given the hysteresis loss per cycle = 15000 ergs and the specific gravity of iron is 8.

8. Describe the action of a lead accumulator during charge and discharge. How would you conduct a test on the capacity and efficiency of a storage battery of 50 cells?

9. State what you know of dielectric absorption in condensers. How is it determined?

Explain how to compare the capacity of two condensers by the method of mixtures.

THIRD YEAR.

ELECTRO-MAGNETISM.

DECEMBER, 1903.

1. A bar magnet has north and south poles (assumed at ends), of strength + 160 and — 160. Cross-section of bar ¾ square centimeters, length of bar 20 centimeters.

A.—What is the magnetic moment of the bar?

B.—The magnetic induction B.

C.—What is the magnetic potential at a point P.,

10 centimeters from the north pole and 20 centimeters from the south?

D.—What is the direction and intensity of the magnetic force at P.?

E.—Draw a line of force from the north pole to south pole through P.

2. A coil of wire of 120 turns (ends of coil open) is revolving at 1,200 R.P.M. in a uniform field of magnetic intensity 8,000. Area of coil 240 sq. centimeters.

A.—What is the average E.M.F. induced in the coil?

B.—What is the maximum E.M.F. induced?

C.—If an electrostatic voltmeter is connected to the ends of the coil, what will it read?

3. An anchor ring coil of mean radius, 5 centimeters, consisting of 10 turns, carries a current of 2 amperes. What is the force acting on a unit pole placed on the axis of the coil at a distance of 10 centimeters from the centre of the coil?

4. A current is sent through a long solenoid (without iron), of known dimensions. A small secondary coil is wound on the centre of the solenoid, and the current induced in it by making or breaking the primary current is measured by a ballistic galvanometer.

Show why the throw of the galvanometer, within certain limits, is proportional to the induction threading the solenoid.

5. A horseshoe magnet of dimensions shown in fig I., is requred to lift a maximum weight of 600 pounds. The number of turns on the exciting coils = 800.

Find current required. B. and H. curves given.

6. Two parallel copper conductors in air, ¼ inch diameter, 1,000 feet long, interaxial distance 12 inches, carry a current of 10 amperes.

What is the total flux set up between these wires?

7. A straight conductor carries a current of 20 amperes, with what force, and in what direction will it move a unit positive pole at a distance of 12 centimeters from the conductor?

8. A wooden anchor ring, inside diameter 15 centimeters, outside diameter 19 centimeters, is uniformly wound with 300 turns of wire. What is the magnetizing force in the core per unit current? If a wrought iron core of permeability 1,200, be substituted, what will be the total flux set up by a current of 10 amperes?

FOURTH YEAR.

ALTERNATING CURRENTS AND ALTERNATING CURRENT MACHINERY.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 1.

1. The field spools of a 20 pole alternator are series connected and contain 616 turns each. The resistance per spool is 1.66 ohms and 6.95 amperes produce 6.4 mega lines per pole. Required the total inductance of field.

Applying a d. c. e. m. f. of 230 volts, required the time for the current to reach one half of its final value. When current has reached its final value, what energy in watt seconds is stored in the field?

2. Given a parallel pair of No. 2 b. and s. copper conductors, insulated with vulcanized rubber of specific inductive capacity 2.9, 5/32″ thick, immersed in water. Each cable is ten miles long and cables are distant apart 300 feet.

Required the coefficient of self induction per mile, the magnetic reactance volts per ampere, at a frequency of 350 p.p.s.; the capacity of cable in m.f. per mile; the charging current per cable, far end insulated; when 1000 volts at a frequency of 350 periods is applied between core and water.

With 25 amperes at 350 p.p.s. flowing in each cable, required the e. m. f. induced in a coil of wire of mean area 6 sq. ft. and containing 500 turns, placed midway between cables, the plane of coil coinciding with plane of cables?

3. Given the circuit shown in Fig. 1.

An e. m. f. $E = 1000$ at 60 cycles is applied.

Required I, I_1, I_2, I_3, I_4, E_1, & E_2; the phase relations of I, E_1, E_2 to E, the phase relations of I_1 & I_2 to E_1, and I_3 & I_4 to E_2.

4. Given an a. c. generator, armature resistance $o = 0.1$ ohms, synchronous reactance $x_0 = 5$ ohms. If the terminal e. m. f. is to be 1000 volts when the output is 100 amperes energy current, and p. f. 80 p.c. what is the nominal induced e. m. f.?

Using the same machine as a synchronous motor and applying 1000 volts to armature, what will armature current be, when motor is developing 90 k. w. and the field so excited that the motor counter e. m. f. is 1500 volts?

5. Assuming the constants of a transformer, show to what extent the primary e.m.f. must be raised to maintain constant secondary e. m. f. as a given load of known p.f. is put on the secondary.

Discuss e. m. f. and current relations in a 6 phase synchronous converter?

6. What tests would you submit the following pieces of apparatus to, in order to form an intelligent opinion as to the proper limits of their use? A soft iron ammeter; an integrating wattmeter; a polyphase a.c. generator; a polyphase induction motor; a synchronous converter. Describe methods of making tests?

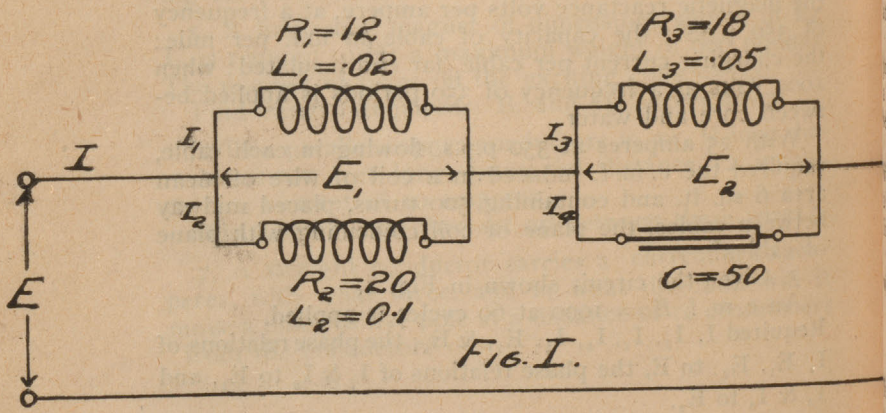


FIG. I.

FOURTH YEAR.

ELECTRIC LIGHTING AND POWER DISTRIBUTION.

DECEMBER, 1903.

1. An arc light dynamo supplies a current of 9.8 amperes through 6 miles of wire, to a series of 95 arcs, each adjusted to 45 volts. Ascertain the size of conductors, the line efficiency to be 96 p.c.

If the resistance of the dynamo is 20 ohms, what is the total voltage generated by the machine?

2. A lighting circuit consists of 20 groups of lamps in multiple; three wire distribution, the groups are 300 feet apart and each group of lamps takes 6 amperes. Size of mains No. O. B. & S. Feeders from the station are connected half-way in the circuit. If the station maintains a potential of 220 at the feeding point, what will be the voltage at each group of lamps? If power at the generating station costs $20 per kilowatt per annum and copper is worth 20 cents a pound, determine the economical section of the feeders?

Distance from station to feeding point 2,000 feet.

3. A pair of No. O. B. & S. mains, 1,000 feet long, is fed at both ends by a pair of feeders No. 00 B. & S., respectively 1,800 and 1,200 feet long. The load distribution is given in Fig. 1.

Ascertain the current in each feeder, difference of potential at feeder points and loss in feeders. Voltage at generating station 125 volts.

4. Show how to ascertain by a graphical method, the proper station site to make the weight of conductors a minimum, the load distribution of the territory to be served having been ascertained.

5. With a given maximum voltage between lines, what is the relative copper economy of single phase, 2 phase with common return and 3 phase transmission lines?

6. Discuss the use of a Storage battery in connection with a plant whose load curve is given in Fig. 2.

How is the proper size of the battery determined?

Show switchboard connections for booster charging.

7. Discuss fully the different systems in use for transforming A. C. constant potential to A. C. constant current for series distribution.

FOURTH YEAR.

ELECTRICAL ENGINEERING.

ELECTRIC TRACTION.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

1. An electric road, single track, 5 miles long, is equipped with No. 0 trolley wire and a main No. 00 running parallel to it and connected to the trolley every half mile.

Feeders 3 miles length and of section equivalent to 1,000,000 c.m., are connected half way in the line. Assuming six cars at equal distances as shown in Fig. 1, and taking average current of 40 amperes per car, assuming resistance of track return negligible. What is the voltage at cars 1 and 6?

Station voltage 550.

No. 0 wire = 133,000 c.m. sectional area.

No. 00 wire = 167,000 c.m. sectional area.

FIG. 1. (Attached.)

2. In Problem I. assuming the track resistance to be .032 ohms per mile and a station return feeder of 1,000,000 c.m. connected at feeder point.

(*a*) What is the voltage at cars 1 and 6?

(*b*) What is the average loss in K. W. in overhead and return?

3. An electric road 7,000 feet long, double track, 125,000 c.m. trolley wire has two feeders, one of 750,000 c.m. sectional area and 2,000 feet long, the other 1,000,000 c.m. 3,500 feet long.

Fifteen cars equally distant are on the road with an average current per car of 40 amperes. Assuming the track resistance negligible. Find the maximum voltage drop. Station voltage 550. Cars are situated as per Fig. 2. (Attached.)

4. 500 Kilowatts average power are to be transmitted a distance of six miles to feed an Electric Railway System at 600 volts.

Line efficiency 90 per cent.

If power at the generating station costs $18.00 per K. W. per annum and copper erected 25 cents per lb.

(interest and depreciation 10 per cent).

What will be the cost of the energy delivered?

5. A car weighing 10 tons is drawn by 4 gearless motors at 10 miles an hour up a grade of 0.8 per cent. The resistance to traction taken at 12 lbs. per ton, diameter of wheels 27 inches. What torque must be exerted by each motor, and what is the work done?

If the coefficient of rail friction be taken at .2 of the pressure of the wheels upon the rails.

What is the maximum grade that can be ascended?

6. An electric car of weight 8 tons is driven by two motors, the maximum torque that can be exerted by each motor is 2,800 lbs. at 1 inch radius. Wheels are 33 inches diameter and ratio of gear to pinion 4.78. If friction and other retarding forces are taken at 12 lbs. per ton, and allowing a mechanical efficiency of 85 per cent.

Find the maximum acceleration that can be given to the car?

7. Electric Power has to be transmitted a given distance from the generating station to operate a number of cars. The average power per car being known.

Discuss fully the conditions of economy that will govern the establishment of:

(*a*) An all copper transmission;
(*b*) Boosters in the generating station;
(*c*) Substation with rotary converters;
(*d*) Batteries in substation.

8. A car must cover a certain distance from start to stop in a given time. The resistance to traction being assumed and also the braking effect.

Show how the ratio of tractive force to weight of car can be ascertained also the maximum speed required, and time from start at which the brakes should be applied?

ENGLISH LANGUAGE AND LITERATURE

FIRST YEAR.

ENGLISH COMPOSITION.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 11.

1. Explain the main principles of paragraph and sentence construction.

2. Draw up outline plans for essays on the following subjects:—(*a*) Bridges; (*b*) The Lachine Canal; (*c*) The Fast Atlantic Service.

3. State clearly the difference in usage between *will* and *shall*, *lie* and *lay*.

4. Write six sentences illustrating the correct use of the colon, semi-colon, and comma.

5. Correct the mistakes in the following sentences:—

(*a*) Either of we three could fill the place.

(*b*) Every one of the inhabitants feel that it is a slur upon them personally.

(*c*) He would neither give it to you or I.

(*d*) He went a different way than I did.

(*e*) It is an interesting book, and which holds the attention to the very end.

(*f*) There is no sense in me going.

(*g*) I did not intend to have missed him, but being late for my appointment, it could not be helped.

(*h*) The spring flowers look beautifully, and smell sweetly.

(*i*) The president, whom, they said, was expected to have been present, was out of town at the time.

(*j*) Will I be expected to write like him?

GEOLOGY

THIRD YEAR

GEOLOGY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12 AND 2 P.M.

1. What do you understand by the term Metamorphism? State what you know concerning its causes and results.

2. State what you know concerning the distribution of Volcanoes upon the present surface of the earth. Describe the recent volcanic eruptions in Martinique and compare them with the eruption of Vesuvius in the year 79 A.D.

3. Show how the geological structure of a country influences its topography. Give examples.

4. Outline the conditions which are necessary for the accumulation of beds of coal in the earth's crust. Where are these conditions now most nearly reproduced in eastern North America? Describe two typical coal plants of the Carboniferous.

5. The Trilobites. Their place in the zoological classification. When do they first appear and what is the last system in which they are found? Describe and figure any three genera and in each case state its range.

6. Describe briefly the following geological formations; in each case state their age and name any economic products which they afford:—

Mountain Limestone, Utica, Clinton, Grenville, Trenton.

7. Draw a sketch map of the Continent of North America and show what portions of it were dry land after the Appalachian Revolution.

8. State what you know concerning the Mesozoic Reptiles.

9. State the mineralogical composition, the structure, the origin and the mode of occurrence of the following rocks:—

Shale, Syenite, Trachyte, Arkose, Grit, Peridotite.

10. State what you know concerning the Cretaceous System as developed in Canada.

2 O'CLOCK P.M.

11. Name the fossils exhibited. State their position in the zoological classification and mention the geological formation to which they belong.

12. Name and describe the mineral and rock specimens.

FOURTH YEAR.

GEOLOGY AND MINERALOGY.

CANADIAN GEOLOGY.—(*First Paper.*)

TUESDAY, APRIL 7TH, 1903:—AFTERNOON, 2 TO 5.

1. (*a*) State what you know concerning the development of the Carboniferous System in Acadia.

(*b*) What are the important economic products of the Carboniferous in Acadia?

2. State what you know of the stratigraphical position, petrographical character and economic importance of the following formations:—

(i.) Atlantic Coast Series.
(ii.) Salina.
(iii.) Helen Iron Formation.
(iv.) Shuswap.
(v.) Corniferous.

3. Give a brief sketch of the geology (including economic geology) of any *one* of the following provinces:—Nova Scotia, New Brunswick, Ontario.

4. Describe the principal physical and geological features of the Cordilleran region of Canada.

5. (*a*) What geological formations are developed in the Interior Continental region of Canada?

(*b*) Describe briefly their area and distribution.

(*c*) What are their principle economic products?

6. State what you know concerning the distribution and character of the Pleistocene deposits in the provinces of Ontario and Quebec.

7. State what you know concerning the gold deposits of the Yukon District.

8. State what you know of the Bog and Lake Ores of Canada.

9. Where is Chromite found in Canada? Describe its mode of occurrence.

FOURTH YEAR.

GEOLOGY AND MINERALOGY.

PHYSIOGRAPHY.—(*Second Paper.*)

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

1. (*a*) Describe the features characteristic of a belted coastal plain, and explain how they originate.

(*b*) Explain what influence topographic features of this type will have upon the human occupation of such a district, and upon the development of lines of transportation. (This question may be answered by discussing a concrete example, ancient or modern).

2. Explain what is meant by the "Geographic Cycle." In this connection discuss *briefly* the following topics:—Development of Drainage, Graded Streams, Development and Shifting of Divides, Development of Meanders, Maturity, Old Age.

3. Give a sketch of the Physiography of Palestine illustrative of the development of certain types of topography. Indicate the types.

4. (*a*) What is meant by "Physiographic Controls"?

(*b*) What is meant by "Climatic Controls of Land Form"?

Illustrate in each case (*a* and *b*) by at least three examples.

5. Describe the following, as to origin and physiographic development, indicating in each case the class of land form represented in the locality indicated:

(i.) Black Hills of Dakota, (ii.) Mount Monadnock,

(iii.) Point Pelee, (iv.) Jura Mountains, (v.) The Escarpment between Niagara Falls and Collingwood, Ontario.

6. Give in some detail a description of the origin and structure of the Physiographic features of Acadia *or* of Ontario west of the Frontenac axis.

7. Classify the Land Forms represented on the Maps *A*, *B* and *C*. Discuss their probable origin and relative ages.

FOURTH YEAR.

GEOLOGY AND MINERALOGY.

(THIRD PAPER) PETROGRAPHY.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.30.

1. Describe the optical characters of Hornblende, Olivine and Andalusite. In what class of rocks does the latter mineral usually occur?

2. What are Spherulites and Pseudospherulites? In what class of rocks do they occur?

3. Describe any case of differentiation in a rock magma.

4. State what you know concerning the origin and geological relations of Serpentine.

5. Describe briefly:—Basalt, Ditroite, Greissen, Gabbro, and Hornstone. Refer these to their places in the petrographical classification.

6. Describe in detail the appearance presented under the microscope by each of the following rocks:—the Syenite from Plauen; the Baveno granite; the Aporhyolite from South Mountain, Pennsylvania.

7. Diorite and Liparite. Their essential and more commonly occuring accessory constituents. Their structure and subdivisions. Are they more or less acid than Limburgite?

8. Name and classify the twenty-five hand specimens. What structures are exhibited by Nos. 21, 22, 23, 24 and 25?

9. Examine the four thin sections under the microscope. State in each case what minerals are present as well as the name and structure of the rock.

FOURTH YEAR.

GEOLOGY AND MINERALOGY.

(FOURTH PAPER) ORE DEPOSITS AND PRACTICAL GEOLOGY.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.30.

1. State what you know concerning the mode of occurrence and genetic relations of Native Platinum.

2. What do you understand by the term Paragenesis? Give examples.

3. What changes are brought about in bodies of metallic sulphides above the water level? Trace the probable changes in the case of an ore body originally composed of Auriferous Pyrite, Blende, Quartz and Rhodochrosite.

4. Give an account of the mode of occurrence and origin of the lead and zinc ores of the Mississippi Valley.

5. Describe briefly the deposits at Potosi, Broken Hill and Leadville.

6. Give an account of the theory of Lateral Secretion including a brief history of its development. What facts are adduced in its favour?

7. Describe the geological occurrence of Tin Ores.

8. What do you understand by Vertical and Horizontal Sections respectively? Explain their uses and their relative advantages.

9. How would you proceed to make a detailed magnetic survey of a small area known to contain a nearly vertical body of magnetic ore? Note particularly the adjustments of the Thalen-Tiberg instrument, the observations taken, the methods of recording and plotting results and their interpretation.

MATHEMATICS AND MATHEMATICAL PHYSICS

FIRST YEAR.

MATHEMATICS, I.

DECEMBER, 1902.

1. Circumscribe a circle about a given regular pentagon.

Prove that the square on the diameter of this circle is equal to the square on a side of the pentagon together with the square on the diameter of the inscribed circle.

2. The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

3. If a series of triangles of equal perimeter are described about the same circle they are equal in area.

4. The difference of the squares on the tangents from any point to two circles is equal to twice the rectangle contained by the line joining their centres, and the perpendicular from the point on their radical axis.

5. Find the locus of a point if the sum of the squares of its distance from two fixed points is constant.

6. Points A^1, B^1, C^1 are taken in the sides of a triangle ABC, so that $\frac{AC^1}{BC^1} \cdot \frac{BA^1}{CA^1} \cdot \frac{CB^1}{AB^1} = -1$.

Prove that AA^1, BB^1, CC^1 are concurrent.

Hence show that the bisectors of the angles of a triangle meet in one point.

7. If a straight line is perpendicular to each of two intersecting straight lines at their point of intersection it will be perpendicular to the plane which contains them.

8. From a point P, PB and PC are drawn perpendicular to two planes which intersect in FH, meeting them in B and C. From B, BK is drawn perpendicular to FH. Prove that CK will also be perpendicular to FH.

9. Find the volume of the frustum of a triangular prism in terms of (*a*) the area of one end and the heights above it of the angular points of the opposite end, (*b*) a right section and the parallel edges.

10. A solid cylinder 36 inches long and 2 inches in diameter is melted and cast into a sphere. Find the diameter of the sphere and its surface.

11. In a parabola show that the locus of the intersection of tangents which are perpendicular to each other is the directrix.

Hence show how to construct a parabola having given two tangents at right angles to each other, and their points of contact.

12. Through a point P on a parabola, a diameter is drawn. Show that it bisects all chords which are parallel to the tangent at P.

13. Find the locus of the centre of a circle which passes through a given point and touches a given circle internally.

FIRST YEAR.

MATHEMATICS, II.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 1.

1. Show that:

(1) $$\frac{(a-b)^{\frac{1}{3}} \times \sqrt[3]{a^2 + 2ab + b^2}}{\sqrt[3]{a^2 - b^2} \times (a+b)^{-\frac{2}{3}}} = a + b$$

(2) $$\frac{3^{n+1} - 6 \times 3^{n-1}}{10 \times 3^{n-3} - \frac{3^n}{27}} = 3$$

(3) $$C_{r+1} + 2\,{}^nC_r + {}^nC_{r-1} = {}^{n+2}C_{r+1}$$

2. Solve:

(1) $$x + y + \sqrt{x + y} = 6$$
$$x^2 - y^2 = 8$$

(2) $$x + 2 = \sqrt{4 + x}\,\sqrt{8 - x}.$$

(3) $$\frac{x^2 - 6}{x} + \frac{5x}{x^2 - 6} = 6$$

3. If y varies as the sum of three quantites of which the first is constant, the second varies as x, and the third varies as x^2; and if $y = 0$ when $x = 1$, $y = 1$ when $x = 2$, and $y = 4$ when $x = 3$, find y when $x = 7$.

4. If $a : b = c : d$ prove that

$$a - c : b - d = \sqrt{a^2 + c^2} : \sqrt{b^2 + d^2}$$

5. Find the sum of the series $3, \sqrt{3}, 1, \ldots$.

(*a*) to 8 terms.

(*b*) to infinity.

6. The last term of an A. P. is ten times the first, and the last but one is equal to the sum of the fourth and fifth. Find the number of the terms and show that the common difference is equal to the first term.

7. Show that the roots of $(x - a)(x - b) = h^2$ are real.

If α and β are the roots of $x^2 - px + q = 0$ show

$$\left(\frac{\alpha}{\beta} - \frac{\beta}{\alpha}\right)^2 = \frac{h^2(p^2 - 4q)}{q^2}.$$

8. A boat's crew consists of 8 men, 3 of whom can only row on one side and 2 can only row on the other. Find the number of ways in which the crew can be arranged.

9. Find the coefficient of x^{32} in $\left(x^4 - \frac{1}{x^3}\right)^{15}$

10. Show that the $(r+1)^{th}$ term of $(1 - x)^{-4}$

$$= \frac{(r+1)(r+2)(r+3)}{1.2.3} x^r$$

11. Find the value of $\sqrt[3]{1003}$ to 5 places of decimals.

12. Find the three cube roots of 1.

13. Show that $\dfrac{\left(\cos\frac{\pi}{6} - i\sin\frac{\pi}{6}\right)^{\frac{1}{2}}}{\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)^{\frac{1}{2}}} = -1$

14. Show by DeMoivre's Theorem that

$$\sin 3\theta = 3\sin\theta - 4\sin^3\theta.$$

15. Find by determinants the value of y in:

(1) $\left.\begin{aligned} x + y &= 1 \\ ax + by &= c \end{aligned}\right\}$

(2) $\left.\begin{aligned} 3x - 2y + z &= -2 \\ x + 3y - z &= 10 \\ 2x - y + 5z &= 13 \end{aligned}\right\}$

16. Solve $\begin{vmatrix} 3 & 2 & x \\ 1 & 5 & 0 \\ 4 & x & 2 \end{vmatrix} = 5$

17. Show that $\begin{vmatrix} 2 & 1 & -7 \\ -4 & -3 & 8 \\ 6 & 5 & -9 \end{vmatrix} = 2 \begin{vmatrix} 1 & 1 & 7 \\ 2 & 3 & 8 \\ 3 & 5 & 9 \end{vmatrix}$

FIRST YEAR.

MATHEMATICS, III.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 1.

1. Show that the radian measure of an acute angle is intermediate in value between the sine and the tangent of the angle.

2. Prove:

(1) $\cos^6\theta + \sin^6\theta = 1 - 3\cos^2\theta \sin^2\theta$

(2) $\cot^4\theta + \cot^2\theta = \operatorname{cosec}^4\theta - \operatorname{cosec}^2\theta$

(3) $\operatorname{cosec} 2\theta + \cot 4\theta + \operatorname{cosec} 4\theta = \cot\theta$

(4) $\dfrac{\tan 5\theta + \tan 3\theta}{\tan 5\theta - \tan 3\theta} = 4\cos 2\theta \cos 4\theta$

3. Find all the values of θ from the equations:

(1) $\tan^2\theta - \sec\theta = 1$

(2) $4\cos 3\theta \sin 2\theta - 2\sin 2\theta - 2\cos 3\theta + 1 = 0$.

4. In any plane triangle $A\,B\,C$:

(1) $(a + b)\sin\frac{1}{2}C = c\cos\frac{1}{2}(A - B)$.

(2) $\sin\frac{1}{2}A = \sqrt{\dfrac{(s-b)(s-c)}{bc}}$

(3) $\sin A + \sin B + \sin C = 4\cos\dfrac{A}{2}\cos\dfrac{B}{2}\cos\dfrac{C}{2}$

5. Given a, b and A in any plane triangle, show that if $a < b$, the number of solutions depends on the value of $\dfrac{a}{b\sin A}$

6. In any right angled spherical triangle ($C = 90°$),

(1) $\cos c = \cot A \cot B$.

(2) $\sin A \sin 2b = \sin c \sin 2B$.

(3) The hypotenuse is less than 90° only when both the other sides are in the same quadrant.

7. In any spherical triangle,

(1) $\cos \frac{1}{2} a = \sqrt{\frac{\cos (S-B) \cos (S-C)}{\sin B \sin C}}$

(2) If $(b + c) = 90°$

$\cos a = \sin 2c \cos^2 \frac{1}{2} A$.

(3) The half sum of any two sides and the half sum of the opposite angles are of the same species.

8. The angles and sides of a spherical triangle are the supplements of the sides and angles respectively of its polar.

9. If two angles of a spherical triangle are right angles, show that the sides opposite to them are right angles, and that the third angle has the same measure as its opposite side.

10. The area of an equilateral spherical triangle is one-fourth the area of the sphere. Find its sides and angles.

11. In the plane triangle $A B C$

$a = 500.6$, $b = 356.8$, $C = 108° 38'$ find c.

12. In the spherical triangle in which

$a = 84° 14' 29''$, $b = 44° 13' 45''$,

$A = 130° 5' 22.4''$, show that

$C = 36° 45' 28''$.

FIRST YEAR.

MATHEMATICS, IV.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

1. A balloon is 125 ft. from the ground, and ascending at the rate of 50 ft. per second. In what time would a body fall from it to the ground?

2. A body is projected on a horizontal floor with a velocity of 20 ft. per second, and the coefficient of frictoin is ¼.

(1) How far will the body move in two seconds?

(2) How much longer and how much farther will it move?

3. The acceleration of the weights of an Atwood machine is one-tenth that of gravity. Find the ratio of the masses.

4. Half of the length of a cylinder is sharpened into a cone, the axis remaining unchanged. Show that the centre of gravity of the solid divides the axis in the ratio 11 : 21.

5. A carpenter's rule 2 ft. long is bent into two parts at right angles, the shorter part being 6 in. long. If this part be placed on a smooth horizontal table, what is the length of the least portion of it which must be on the table that it may remain in equilibrium?

6. A horizontal force of 7 pounds supports a weight of 24 pounds on a smooth inclined plane.

(1) Find the pressure on the plane.

(2) What would be the pressure on the plane if the weight were suported by a force parallel to the plane?

7. An engine weighing 40,000 pounds moves at 15 miles per hour round a curve of 1100 ft. radius.

(1) The road-bed being assumed level transversely, find (in pounds) the transverse pressure on the rails.

(2) Show that the inclination of the road-bed that there may be no transverse pressure is $\tan^{-1}(.01375)$.

8. The magnitudes of two components are P and Q, and the angle between them is θ ; find the resultant.

If the components be 4 each and the angle 30°, show that the resultant $= 2(\sqrt{6} + \sqrt{2})$.

9. A piece of lead (sp. gr. 11) weighing 1⅜ pounds is suspended in water by a string. Find the tension of the string.

10. Equal volumes of two fluids whose specific gravities are 1 and 1.7 contract when mixed by one-tenth of their original volume. Find the specific gravity of the mixture.

SECOND YEAR.

MATHEMATICS, I.

DECEMBER, 1903.

1. The angular points of a triangle ABC are (2, 5), (—1, 1), (—6, 13), find:—

(1) The tangent of the angle A.

(2) The equation of the bisector of the angle B.

(3) The area.

2. Given the circle $x^2 + y^2 + 2x - 6y + 2 = 0$, find:—

(1) The lengths of the tangents from the origin.

(2) The equations of these tangents.

(3) The polar of the point $\left(\frac{1}{3}, \frac{1}{3}\right)$ with respect to the given circle.

3. The circle of question 2 is cut by the line $x - 2y + 1 = 0$ in the points P, Q; find:—

(1) The length of PQ.

(2) The equations of the two circles which pass through P and Q, and also touch the axis of x.

4. (1) Transform the equation

$$2x^2 + 3xy - 2y^2 + x + 7y - 8 = 0$$

to parallel axes through the point (—1, 1).

(2) Turn the new axes through the angle $\tan^{-1}\frac{1}{3}$ and show that the reduced equation is $x^2 - y^2 = 2$.

5. Find the equation of the straight line which touches the parabola $y^2 = 4px$, and makes an angle $\tan^{-1}m$ with the axis of x.

6. What are the co-ordinates of the vertex of the parabola $x^2 - 6x + 4y - 3 = 0$? What is the equation of the directrix?

7. Show that the eccentric angle at the end of the latus rectum in the first quadrant of an ellipse is $\cos^{-1}e$. What is this angle in the case of the ellipse $3x^2 + 4y^2 = 1$?

8. Prove that the equation of the normal at any point of an ellipse is

$$\frac{a^2 x}{x_1} - \frac{b^2 y}{y_1} = a^2 - b^2.$$

9. Find the eccentricity and also the equations of the asymptotes and directrices of the hyperbola $x^2 - y^2 = 2$.

10. Prove that the rectangle contained by the perpendiculars let fall from any point of a hyperbola on asymptotes is constant and equal to $\frac{a^2 b^2}{a^2+b^2}$

SECOND YEAR.

MATHEMATICS, II.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.30.

1. If $y = x - \cos^2 x$, $\frac{d^2 y}{dx^2} + 4y = 4x - 2$.

2. If $u = \frac{xy}{x+y}$, $x\frac{du}{dx} + y\frac{du}{dy} = u$.

3. Show that (given $\log 2 = .693$)

(1) $\int_0^2 \frac{dx}{x^2+4} = \cdot 393$, (4) $\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} \cot\theta \, d\theta = \cdot 347$,

(2) $\int_0^2 \frac{x\,dx}{x^2+4} = \cdot 347$, (5) $\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} \cot^2\theta \, d\theta = .215$

(3) $\int_0^2 \frac{x^2\,dx}{x^2+4} = \cdot 429$, (6) $\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} \cot^3\theta \, d\theta = \cdot 153$.

4. Also that

$$\frac{8(x-1)\,dx}{x^4+4x^2} = \frac{2}{x} + \log\frac{x^2}{x^2+4} + \tan^{-1}\frac{x}{2}$$

5. By integrating by parts (or otherwise) show that

$$\int_0^a \frac{x^2\,dx}{\sqrt{a^2-x^2}} = \frac{\pi a^2}{4}.$$

6. Show that the greatest value of $\frac{\log x}{x^2}$ is $\frac{1}{2e}$

7. A high vertical wall is to be braced by a beam which has to pass over a parallel wall 8 ft. high and 27 ft. distant from the other. Show that the beam must be at least $13\sqrt{13}$ ft. long.

8. The equation of a curve is $\frac{4}{x^2} - \frac{9}{y^2} = 1$.

(1) Find the tangents at the origin.
(2) Find the asymptotes.
(3) Show that $\frac{d^2y}{dx^2} = \frac{36x}{(4-x^2)^{\frac{5}{2}}}$
(4) Where are the points of inflexion?
(5) Show that the radius of curvature when $x = 1$ is $\frac{19}{12}\sqrt{19}$.

(6) Prove that the whole area between the curve and the asymptotes is 24.

(7) And that the volume of the solid formed by revolving this area about the axis of y is $12\pi^2$.

9. Prove that the moment of inertia of a uniform sphere about a diameter = mass $\times \frac{2}{5}$ (radius)^2.

SECOND YEAR.

MATHEMATICS, III.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.30.

1. The velocity-time curve of a moving point being given, prove a graphical method of finding the acceleration at any instant.

2. A wheel of a moving carriage is 3½ feet in diameter and makes one revolution per second. Find in magnitude and direction the velocity of a point on the rim at the instant when it is on a level with the axle.

3. A point starts from rest with a constant acceleration, show that in the second half of any interval of time it describes three times the distance it does in the first half.

4. Show that the time of descent from a given point to the centre of a circle vertically below it, is the same as that to the circumference down a tangent.

5. A 50 ton engine pulling four 20 ton cars starts from rest with an acceleration of 5 feet per second,

find the pull on the draw bar of the engine. When the speed has reached 30 miles per hour steam is shut off and the train is stopped in half a mile by the engine brakes, find

(*a*) The opposing force exerted by the brakes.

(*b*) The stress in the coupling between the middle cars.

6. Find the equation of the path of a particle projected with a velocity of u feet per second at an angle to the horizontal. What is the hodograph?

Determine the angle of elevation so that the horizontal range may be equal to the space through which a body must fall in order to acquire the velocity of projection.

7. Prove that the velocity-time curve of a point moving with simple harmonic motion is a sine curve.

The maximum velocity of a point moving with S. H. M. is 4 feet per second, the period is π seconds; find:—

(*a*) The amplitude.

(*b*) The velocity when at 1 foot distance from the mean position.

(*c*) The acceleration at the same time.

8. Prove that the resultant of a number of forces acting in one plane passes through the point of intersection of the first and last sides of the funicular polygon.

9. Forces 1, 3, 5 and 7 pounds act along the sides of a square of 12 inches side. Find the resultant in magnitude and position.

10. Find the centre of gravity of the accompanying figure.

11. Draw the stress diagram for the accompanying figure indicating the nature of the stresses.

Find the reaction R at O, and the tension T.

THIRD YEAR.

MATHEMATICS, I.

DECEMBER, 1903.

1. Find the equation of the plane which passes through the point (2, —1, 3) and is parallel to the plane $3x - 12y + 4z = 5$. What angle does the plane make with the plane of xy?

2. Prove that the centre of any conic $u = o$ is found by solving the simultaneous equations $\frac{du}{dx} = 0, \frac{du}{dy} = 0$.

3. Given the conic

$$2x^2 + 3xy - 2y^2 + x + 7y + 2 = 0.$$

(1) Find the centre.

(2) Find the tangent of the angle which the principal diameters make with co-ordinate axes.

(3) Reduce the equation to the principal diameters, and draw the curve.

4. What are conjugate diameters? Show that the length of the equal conjugate diameters of the ellipse $3x^2 + 4y^2 = 12$ is $\sqrt{14}$.

5. Show that

(1) $\frac{\log \sec x}{x^2} = \frac{1}{2}$, when $x = 0$,

(2) $(a^{\frac{1}{x}} - 1)x = \log a$, when $x = \infty$.

6. Prove that the vertical angle of the cone of greatest volume, which can be described by a right-angled triangle of given hypothenuse is $2 \tan^{-1}\sqrt{2}$.

7. Show that the radius of curvature of the curve $(y - x^2)^2 = x^5$ at the origin is $\frac{1}{2}$.

8. Show that $\log \sec x = \frac{x^2}{2} + \frac{x^4}{12} + \ldots$

9. By the substitution $x = \sec\theta$ (or otherwise), show that

$$\int \frac{dx}{x^3\sqrt{x^2-1}} = \frac{1}{2}\left(\sec^{-1}x + \frac{\sqrt{x^2-1}}{x^2}\right)$$

10. Show that

(1) $\int_0^{\frac{1}{4}\pi} \tan^4\theta\, d\theta = .119$, (2) $\int_1^2 \frac{dx}{x^3\sqrt{x^2-1}} = .740$,

(3) $\int_0^{\frac{1}{2}\pi} \cos^5\theta \sin^6\theta\, d\theta = .012$.

11. An ellipse revolves about its major axis. Show that the volume and surface of the prolate spheroid thus formed are, respectively,

$$\frac{4}{3}\pi ab^2 \text{ and } 2\pi b^2 + \frac{2\pi ab}{e}\sin^{-1}e,$$

where e is the eccentricity.

THIRD YEAR.

MATHEMATICS, II.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. A rigid circular disc, of radius 2 ft. and mass 5 lbs., turning about a horizontal tangent falls from rest from its highest position.

(1) Show that when it becomes horizontal the velocity of the centre is $\frac{16}{5}\sqrt{10}$ ft. per sec.

(2) That the vertical and horizontal pressures on the axis are 1 pound and 8 pounds, respectively.

(3) If the centre is suddenly fixed when the disc is horizontal, show that the impulses at the centre and the axis are $\frac{5}{8}\sqrt{10}$ and $-\frac{1}{8}\sqrt{10}$ pound-second units, respectively.

(4) If the disc be lowered and allowed to make small oscillations, show that the time $= \frac{\pi}{8}\sqrt{5}$ seconds.

2. A ladder is to rest with its extremities A and B against a vertical and a horizontal plane. The coefficient of friction at A and B is $\frac{1}{3}$.

(1) Show that the least inclination to the horizon will be $\tan^{-1}\frac{2}{4}$.

(2) If from this position the ladder be allowed to slide down, what will be the ratio of the velocities of A and B when the inclination is 30°?

3. A car comes to rest after moving 192 ft. on a level track where the resistances amount to 10 pounds per ton. How far would it have gone up a one per cent. grade where the resistances are 12 pounds per ton?

4. In testing an engine running at 100 revolutions per minute, the lever-arm of the friction brake employed was 10½ ft. and the weight attached 2,000 pounds. Find the horse power expended on the friction.

5. A ball weighing 2 lbs. strikes with a velocity of 4 ft. per sec. an 8 lb. ball at rest. The coefficient of restitution is $\frac{1}{4}$. Find the velocities after the impact, the latter being (1) direct, (2) at an angle 45°.

6. Find the centre of pressure of a triangle immersed vertically with one side in the surface of the fluid.

MECHANICAL ENGINEERING

SECOND YEAR.

KINEMATICS OF MACHINES.

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

(Figures give proportional marks. Use sketches to illustrate your answers. Ten questions may be attempted.)

1. Distinguish between a Structure and a Mechanism. Define:—Closed pair, Spheric motion, Simple chain. (10)

2. Explain the following statement:—The two centrodes corresponding to the relative motion of two bodies always touch at a point. (10)

3. A body moves with variable linear velocity. What is meant by the instantaneous velocity of the body, and how can that velocity be determined from observations of the times in which the body describes various known distances measured from a given point on its path? (10)

4. Show how to draw a curve of acceleration on a time base, if a curve of velocity on a time base is given. (10)

5. What is a change-point? Give an example of a mechanism in which such points occur. (8)

6. The swinging-block slider-crank chain is utilized as a quick-return motion. Show how to find the angular velocity of the swinging block for any given position of the mechanism. (12)

7. Show that in a double slider-crank chain, a point on the link which carries an element of each of the two turning pairs will describe an ellipse with regard to the link carrying the two sliding pairs. (12)

8. Give two examples of the closure of incomplete chains. (8)

9. In a pair of toothed wheels, having given the tooth-outlines, show how to find graphically the relative sliding velocity of the teeth. (10)

10. What is an epicyclic wheel-train? Show how to determine the velocity ratio in such a train. (12)

11. What is an escapement? How are escapements classified? (10)

12. Explain how to determine the velocity ratio in a pair of screw-wheels. (12)

SECOND YEAR.

MECHANICAL DRAWING.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 1.

The accompanying blue-print shows an elevation and section of stub for main crank pin and knuckle joint of a locomotive.

(*a*) Draw in pencil details of,
(1) end of coupling rod marked "A"
(2) brass marked "B,"
(3) pin marked "C,"
(4) outside bush marked "F."
Scale ½ size.
(*b*) When all pencil work is finished ink in:
(*c*) When all the drawings are inked in, dimension.

THIRD YEAR.

DYNAMICS OF MACHINERY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

NOTE.—*Only ten questions are to be attempted. The figures after the questions show proportionate marks awarded.*

1. A horizontal double acting steam engine has the following dimensions:—

Cylinder diameter . . . . . 12.5 inches
Stroke . . . . . 12 "

The connecting rod is six cranks long.
If the initial steam pressure be 100 lbs. per sq. in.

(gauge) and the exhaust pressure atmospheric, find the torque on the crank shaft when the crank makes an angle of 60° with the horizontal. (15)

2. Prove any formulae that you may employ in question one. (10)

3. If the engine of question one be making 300 r.p.m.; find what proportion of the total force acting on the piston is required to accelerate the reciprocating parts at the ends of the stroke.

The weight of the reciprocating parts is 200 lbs. (20)

4. If the mean effective pressure acting on the piston of the engine of question one be 40 lbs. per sq. inch, find the I.H.P. at 300 r.p.m. (10)

(*a*) If the fluctuation of energy be 20 per cent. of the energy of one revolution, find the weight of such a flywheel, six feet in diameter, that the fluctuation in speed may not exceed 3 per cent. (20)

5. State as concisely as you can the laws of friction as derived from experiments on unlubricated sliding bodies. (15)

6. From two to three horse power is transmitted by a belt, and an accurate determination of the power transmitted is desired. Describe any form of dynamometer you would employ for this purpose.

Point out the frictional and other losses in the dynamometer. (15)

7. Find the pitch of a screw thread of maximum efficiency. (20)

8. A rope makes two complete turns around a snub-post, and a man exerts a pull of 100 lbs. on one end of it. If the coefficient of friction be 0.33 find the pull on the other end of the rope that will just overcome that of the man. (15)

9. The taper of a cotter is 1 in 6; what must be the coefficient of friction so that it will just slack back when not held in place. (20)

10. A vertical shaft, 4 inches diameter, rests in a flat pivot bearing, over the whole surface of which the pressure is uniform. The weight on the bearing is 1,000 lbs.

Find the work done in overcoming the frictional resistances when the shaft is making 300 r.p.m.

Take 0.01 as the value of the coefficient of friction. (15)

11. A horizontal shaft, 4 inches diameter, rests in a bearing 6 inches long. If the weight on the bearing be 1,000 lbs., and the intensity of the normal pressure uniform over the whole surface, find the work done in overcoming the frictional resistances when the shaft is making 300 r.p.m.

Take 0.01 as the value of the coefficient of friction. (15)

THIRD YEAR.

MACHINE DESIGN.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

NOTE.—*Notes, reference books, etc., may be consulted. Only ten questions to be attempted. The figures after the questions show the proportionate marks awarded.*

1. A cylinder 24 ins. in diameter is to be subjected to a steam pressure of 100 lbs. per sq. in. (gauge). Find bolt diameter and number of bolts required to fasten on the cover. The bolt circle is 28 ins. in diameter and the circumferential pitch is six times the bolt diameter. (10)

2. Find the diameter of a short, wrought iron pump rod, the bucket being 20 ins. in diameter and the water pressure 25 lbs. per square inch (gauge). (10)

3. A crane chain has links made of iron ¼ inch diameter. What load will it safely bear. (10)

4. A steel Lancashire boiler, 8 ft. diameter, has a working pressure of 100 lbs. per sq. in. (gauge). Find the thickness of the plate and design the longitudinal joint.

(*a*) Show by means of freehand sketches the arrangements of the plates at the intersection of the longitudinal with the circumferential seam. (20)

5. Two lengths of mild steel tie rod, 7 ins. by 1 in., are connected as shown by Fig. 1. Find the efficiency of this joint. (20)

6. Find the relative weights of two round shafts of equal strength, the one solid and the other hollow, with a hole the diameter of which is equal to one half the outside diameter. (15)

7. A shaft pulley is 8 ft. from one bearing and 2 ft. from the other. The weight of the pulley is 100 lbs. and its diameter is 3 ft. The total belt tension (downwards) is 200 lbs.

The pulley rotates at 200 r.p.m. and 5 horse power is being transmitted by the belt.

Find the diameter of the shaft (mild steel). (20)

8. The flat ends of a boiler are stayed together by a number of horizontal stays, 20 ft. long and 2 ins. diameter. Each stay supports a flat area of 15 sq. in. The working pressure is 120 lbs. per sq. in. (gauge). Find the maximum stress in the stays due to combined tension and bending, if the material of the stay weighs 0.29 lbs. per cub. in. (15)

9. Design a cast iron, flange, coupling for a mild steel shaft, 3 inches diameter. Make freehand sketches and fully dimension. (20)

10. A double acting steam ergine has the following dimensions:—

Diameter of cylinder	10½ inches
Length of stroke	12 "

The connecting rod is six cranks long.

Distance from centre to centre of main bearings, 3 ft.

The initial steam pressure is 125 lbs. (abs.).

(*a*) What diameter would you make the piston rod?

(*b*) What diameter would you make the crank shaft? (20)

11. Design a suspension link as shown in Fig. 2. The load on the link is 1,000 lbs. Make freehand sketches and fully dimension. (20)

THIRD YEAR.

MECHANICAL DRAWING.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 1.

The accompanying blue-print shows a plan and section of a 5½" × 6" Duplex. Pump.

SECTION A.

(For Mechanical Engineering Students only.)

Draw a section through the other cylinder and valve from that shown on the blue-print, also show valve gear in position.

The drawing need only be penciled in.

Scale ½ size

SECTION B.

(For Electrical and Mining Students only).

(*a*) Draw details of piston and of the links marked "A," "C" and "F." Scale ½ size.

(*b*) When all pencil work is finished ink in;

(*c*) When all the drawings are inked, dimension.

THIRD YEAR.

THERMODYNAMICS.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

NOTE.—*Only ten questions to be attempted of which two must be from section B.*

The figures after the questions show the proportionate marks awarded.

SECTION A.

1. How much heat is required to convert one lb. of water (from 32°F.) into steam at 150 lbs. per sq. in. pressure (abs.) and superheat it to 400°Fahr.? (10)

2. How much external work is done by the working substance during the process described in question one? (10)

3. A vessel of 10 cub. ft. capacity has in it four pounds of a mixture of steam and water at 100 lbs. pressure; twenty-five pounds of water at 60°F. are pumped into the vessel. What is the resulting temperature, assuming that there is no radiation of heat. (20)

4. If 10 pounds of air at 200°F. occupy 120 cub. ft. what must be the pressure? (10)

5. How much heat is required to raise 15 cub. ft. of

air at 100 lbs. pressure per sq. in., from 60°F. to 100°F. at constant volume. (10)

6. Define entropy. Calculate the increase of entropy of one pound of water when heated from 520°F. to 760°F. (abs.). Find the further increase in entropy if the water is completely evaporated at the higher temperature. (20)

7. An engine, under ideally favourable conditions, takes steam from a boiler at a temperature of 327.6°F. and restores condensed water to the boiler at a temperature of 212°F. What is the greatest amount of work that such an engine can do per lb. of steam? (20)

8. How would you calculate the volume of 1 lb. of steam? State the advantages of your method. (15)

9. State the laws of the permanent gases. (10)

10. Deduce an expression which will show the work done by a perfect gas when it expands isothermally from a pressure P to a pressure P_2. (15)

SECTION B.

11. In a test on a Peabody throttling calorimeter, to obtain the dryness of steam, the following readings were taken:—

Pressure in steam pipe (gauge)	85 lbs. per sq. in.
" in calorimeter (gauge)	5 " " "
Temperature in calorimeter	237°F.
Barometer reading	15 lbs. per sq. in.

Find the dryness of the steam.

12. In a test on a double acting Blake steam pump, the following figures were obtained:—

Diameter of steam cylinder	4.5 inches.
" of water cylinder	2.75 "
Length of stroke	4.5 "
Average mean effective pressure acting on steam piston	31.3 lbs. per sq. in.
Average mean effective pressure acting on pump plunger	83.3 " " "
Duration of test	30 mins.
Total number of strokes	4200
" weight of steam used by engine	63 lbs.
" water pumped	596 "

Find:—

(*a*) The I.H.P. of steam end.
(*b*) The I.H.P. of pump end.
(*c*) The mechanical efficiency.
(*d*) The volumetric efficiency.
(*e*) The steam used per I.H.P. per hour.

TABLE OF PROPERTIES OF SATURATED STEAM.

Pressure Pounds per Square Inch.	Temperature Degrees Fahr.	Heat of the Liquid.	Total Heat.	Heat of Vaporizati n.	Entropy of the Liquid.	Specific Volume.
1	101.99	70.0	1113.1	1043.0	0.1329	334.6
2	126.27	94.4	1120.5	1026.1	0.1754	173.6
3	141.62	109.8	1125.1	1015.3	0.2013	118.4
4	153.09	121.4	1128.6	1007.2	0.2203	90.31
5	162.34	130.7	1131.5	1000.8	0.2353	73.22
6	170.14	138.6	1133.8	995.2	0.2480	61.67
20	227.95	196.9	1151.5	954.6	0.3363	19.91
66	299.0	268.3	1173.0	904.7	0.4350	6.490
100	327.58	297.9	1181.9	884.0	0.4733	4.403
150	358.26	330.0	1191.2	861.2	0.5133	3.011

B.Sc. EXAMINATION.

DESIGNING.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 1

1. The air compressor in the thermodynamic laboratory has the following dimensions and particulars:—

High pressure cylinder diameter . . . . . 10 ins.
Low pressure cylinder diameter . . . . . 17 "
Length of stroke . . . . . 15 "
The main bearings are 23 ins. centre to centre.
The cylinders are 40 ins. centre to centre.
Maximum speed 80 r.p.m.
The cranks are overhung.

Design:—

(*a*) Piston rod.
(*b*) Crank shaft.
(*c*) Main bearings.
(*d*) Connecting rod.
(*e*) Crank pin.

Assume that the maximum pressure on H.P. piston rod is equal to the maximum pressure on L.P. piston rod and that the discharge from L.P. cylinder is 40 lbs. per sq. in. pressure (gauge).

Make pencil sketches of and dimension the parts designed.

B.Sc. EXAMINATION.

DYNAMICS OF MACHINERY.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 12.

1. How would you proceed to balance a horizontal, compound steam engine with cranks at right angles?

2. A steam engine develops 1,000 H.P. at 100 r.p.m. The flywheel weighs 40 tons and has a radius of gyration of 15 ft. Neglecting all hurtful resistances, and assuming that the indicator cards have the same area at all speeds, find how long the engine will take to get up speed from rest.

3. In a loaded centrifugal governor, the pendulum arms and the sleeve rods are of equal length. Find an expression which will show the relation between the speed of rotation and the radius at which the balls rotate.

4. Explain a method of drawing a curve of controlling force for a pendulum governor, which also shows the revolutions and radius at which the pendulum acts.

5. In a governor similar to that in question two, each ball weighs six pounds and the sleeve weighs 40 lbs. If the arms are each six inches long, find at what speed the governor must rotate to be in equilibrium, when the centres of the balls are three inches distant from the centre line of the spindle.

6. A horizontal shaft, 4 inches diameter, rests in a bearing six inches long. If the weight on the bearing be 1,000 lbs. and the normal pressure uniform at all

points, find the work lost in overcoming the frictional resistance when the shaft is making 300 r.p.m.

Assume 0.01 to be the value of the coefficient of friction.

7. A vertical shaft, 4 inches diameter, rests in a flat pivot bearing, over the whole surface of which the pressure is uniform. The weight on the bearing is 1,000 lbs. Find the work lost in overcoming the frictional resistances when the shaft is making 300 r.p.m.

Assume 0.01 to be the value of the coefficient of friction.

8. The time of a small oscillation of an engine connecting rod is second. The centre of mass is 20 inches from the point of suspension. Find the moment of inertia of the rod.

9. An empty elevator car weighs 10,000 lbs., and its balance weights weigh 12,000 lbs. The four wheels over which the rope runs weigh 500 lbs. each, have a radius of 2 ft. 3 in., and a radius of gyration of 2 ft.

Find the torque which must be applied to the driving pulley to make the elevator descend with an acceleration of 4 ft. per sec.

10. A locomotive is rounding a curve of 400 ft. radius at the rate of 40 miles per hour. The rails are 4 ft. 10 inches apart centre to centre. Find the effect on the rails due to the gyrostatic action of the four driving wheels. Each wheel is 5 ft. diameter, has a radius of gyration of 2 ft. 3 ins. and weighs 1,000 lbs.

FOURTH YEAR.

MACHINE DESIGN.

(*Course for Students in Electrical Engineering.*)

WEDNESDAY, DEC. 17TH:—AFTERNOON, 2 TO 5.

(*Figures in brackets give proportional marks. Any seven questions may be attempted.*)

1. Explain with sketches the right method of caulking boiler seams and rivets. Discuss briefly the effect of friction on the strength of riveted joints. (15)

2. Two bars of mild steel, 7″ + 1″, are to be connected by a butt joint having a cover plate on each side. Sketch the joint you would propose, and calculate its percentage strength. Take diameter of rivets as 1⅛″, and ratio of tensile to shearing stress as 1.2 : 1. (20)

3. Find an approximate expression for the tension at the ends of a stretched wire of uniform section, in terms of the sag, weight of unit length, and span. Ends of wire are at same level. (15)

4. The main shaft of a steamship transmits 1,000 H.P. at 80 R.P.M., and is of mild steel 9½″ diameter. It is subjected to a longitudinal thrust of 25,000 lbs. Find the resultant simple tensile or compressive stress due to the combined torsion and compression. (20)

5. A pair of cast iron bevel wheels transmit 100 H.P. between shafts at right angles, which run at 200 and 100 R.P.M. respectively. The smaller wheel is 30″ in greatest diameter of pitch circle. Find the numbers of teeth, and show how to find the forms of the pitch surfaces. Allowable stress 2,500 lbs. sq. inch. Pressure per inch width of tooth not to exceed 300 lbs. (20)

6. A cast iron pulley, 24″ diameter, transmits 200 H.P. at 750 R.P.M., and has six arms. Find suitable dimensions for these (assume rectangular section, thickness $= \frac{1}{3} \times$ breadth, stress 2,000 lbs. per sq. inch). (20)

Neglect stresses due to casting, or to centrifugal force.

7. A slide valve has 2″ travel, $\frac{7}{16}$″ lap, and $\frac{3}{16}$″ lead. Draw a Zeuner valve diagram, find the angular advance of the eccentric, and mark the crank positions at admission, cut off, release and compression. (20)

8. Describe the Renold high-speed chain, and explain its action when worn. (15)

9. Discuss briefly the conditions under which worm gearing may be expected to attain high efficiency. (15)

FOURTH YEAR.

MACHINE DESIGN.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.

(Figures give proportional marks. Seven questions may be attempted).

1. In designing machine parts which are to be of cast metal, certain limitations are imposed by the nature of the material, and by the difficulties of moulding and casting. Discuss briefly the various ways in which these considerations affect the design. (10)

2. Give some account of the methods adopted in staying flat surfaces in boilers (such as the crown sheet of a locomotive fire box), and explain how to work out the strength of the stays required. (10)

3. A bar of mild steel (weight 0.3 lbs. per cubic inch) of uniform cross section, has one end attached to a shaft whose axis is at right angles to the length of the bar. Find an expression for the increase in length of the bar under the action of centrifugal force, if the shaft rotates with known angular velocity. (15)

4. The driving wheel axle of a locomotive has the following particulars:—

Load on each wheel	18,000 lbs.
Distance between centres of wheels	4′ 11″
" " " of axle boxes	3′ 6″
Maximum value of coefficient of friction between wheel and rail	0.3
Diameter of journals	8″
Diameter of wheel	4′ 6″

Find the stress due to combined bending and torsion, supposing the axle has to transmit the torque to one wheel. (20)

5. A worm driven elevator hoists 2 tons at 100 feet per minute. The hoisting rope is coiled on a barrel 19 inches diameter, secured to a worm wheel 24 inches diameter, making one revolution for 20 revolutions of the worm. The efficiency of the whole is 0.7. If the worm shaft is 1½ inches diameter, find the stress in it due to combined thrust and torsion. (25)

6. Sketch the form of groove suitable for the rim of a pulley driven (*a*) by a manilla rope, (*b*) by a wire rope. Give some account of the causes which limit the power transmitted by a rope in these two cases. (15)

7. Show that in a spring ring of uniform thickness, as used for piston packing, the diameter of ring when unstrained should be from 1/7 to 1 25 greater than the diameter of the cylinder bore. (15)

8. Find the thickness of the barrel of a steam cylinder 18 inches diameter by 15 inches stroke. Test pressure 200 lbs. per sq. inch. Give reasons for adopting the formula you use. (15)

9. Explain how to draw an oval valve diagram. Sketch such a diagram for a valve having 2″ travel, 7/16″ steam lap and 3/16″ lead. Neglect the obliquity of the connecting rod. (20)

10. During experiments on the torsional vibration of the shaft of a certain steamship the following figures were obtained:—

Effective length of shaft	3800 cm.
Diameter of shaft	25 "
Revolutions per minute	105
Mean relative angular displacement of forward end of shaft relatively to after end	0.118 radian
Maximum do	0.326 "
Modulus of rigidity of material of shaft	828,000 kg/cm^2
I.H.P. of engines (metric)	1,500

(One metric H.P. = 7500 kilogram-centimetres per second.)

Find (1) the maximum stress due to torsion (in kg/cm^2).

(2) The mechanical efficiency of the engine. (30)

FOURTH YEAR.

MECHANICAL ENGINEERING.

(Course for Civil, Electrical and Mining Students.)

DECEMBER, 1902.

(Nine questions may be attempted.)

1. In testing the economy of performance of a boiler installation, what measurements have to be made? Explain how to determine from such measurements (*a*) the efficiency of the boiler and (*b*) the efficiency of the furnace.

2. Find the probable coal consumption for heating purposes in a building requiring 10 million lbs. of steam per annum, having given the following data:—

Average steam pressure (gauge),	5 lbs. per sq. in.
Average feed temperature,	140° F.
Average equivalent evaporation per lb. of coal from and at 212° F.,	8.0 lbs.
Latent heat of steam at 20 lbs. per sq. inch (absolute),	955 B.T.U.
Temperature corresponding to that pressure,	227° F.
Latent heat of steam at 212° F.,	966 B.T.U.

3. Describe the functions of the various valves and fittings attached to an ordinary steam boiler.

4. Describe briefly some one form of mechanical stoker.

5. A single cylinder non-condensing steam engine, working at 100 lbs. per sq. inch (gauge), cuts off at 0.66 stroke when working at maximum power. The cylinder is 13″ dia. × 14″ stroke. Assuming a diagram factor of 0.8, and a mechanical efficiency of 0.85, estimate the probable B.H.P. at 250 R.P.M.

Log 1.5 = 0.4055.

6. Discuss briefly the two methods of governing steam engines.

7. A single cylinder gas-engine giving 10 B.H.P. at 200 R.P.M. has one impulse every two revolutions, and overcomes a uniform resisting torque. Assuming that the torque exerted by the engine is uniform during one-half-revolution and is then zero during three

half-revolutions, find the coefficient of fluctuation of speed. The fly-wheel weighs 2,500 lbs., and has a radius of gyration of 2.5 feet.

8. A gas engine uses 60 cub. ft. of producer gas per I.H.P. per hour. Find the cost (for fuel only) of one I.H.P. per year of 3,000 working hours, having given,

Thermal efficiency of producer, 0.80
" value of coal per lb., 14,000 B.T.U.
" value of gas per cu. ft., 150 B.T.U.
Cost of coal per long ton, $5.50

9. Sketch the form of indicator diagram obtained from a pump in good working order, drawing from a tank, and discharging into a pipe under pressure. What information can be gained from such a diagram?

10. What are the chief points upon which the goodness, or otherwise, of an air compressor depends? Explain how the merit of the compressor from a thermodynamic point of view may be expressed numerically?

FOURTH YEAR.

MECHANICAL ENGINEERING.

MONDAY, APRIL 6TH, 1903:—MORNING, 9 TO 12.

(Ten questions may be attempted.)

(Figures give proportional marks.)

1. Give a brief account of the nature and causes of the various corrosive actions occurring in steam boilers. (10)

2. Describe the construction and working of a Green's Economizer.

A Boiler Installation burns 100,000 lbs. of coal per day of 10 hours. The actual evaporation at 125 lbs. per sq. inch by gauge is 8 lbs. per lb. of coal, from a feed temperature of 120°. If an economizer is fitted which will raise the feed temperature to 220°, but which necessitates the use of mechanical draft supplied by a fan using 1200 lbs. of steam per hour, find the increase in the capacity of the plant.

L at 140 lbs. per sq. inch abs. $= 865$
corresponding temperature $= 353°$ (15)

3. Explain how to find the "Referred Mean Pressure" in a multiple-expansion engine.

A triple expansion condensing Corliss engine is to be directly coupled to a generator giving 1000 K..W. at 90 revolutions per minute. The working pressure is 180 lbs. per sq. inch (gauge). Find suitable dimensions for the three cylinders, assuming that at full load the cut off in the H. P. cylinder is at 0.4 stroke, and taking a piston speed not exceeding 600 ft. per minute the Referred Mean Pressure will be about 33 lbs. per sq. inch. The total rate of expansion may be 12. (15)

4. Under what conditions would you recommend (*a*) a surface condenser, or (*b*) a jet condenser for a steam power plant? Give your reasons. (10)

5. What are the various methods of igniting the charge in gas engines? Discuss briefly the practical difficulties met with in the operation of large gas engines. (10)

6. Describe the nature of the chief chemical actions occurring in the Dowson gas-producer. (10)

7. Having given the working pressure and sizes of cylinders in a locomotive, show how to determine the weight required for adhesion. (10)

8. Explain the various ways in which the power of a locomotive is expended when hauling a train. How is the mechanical efficiency of the engine determined? (12)

9. What are the functions of the "Engineer's Brake Valve" in operating the Westinghouse Air Brake? (10)

10. Describe the method of determining the resistance of a proposed ship by means of model experiments. (12)

11. Give a typical account of the expenditure of power in the case of a marine engine.

A proposed ship will have a total resistance (at 25 knots) of about 430,000 lbs. Find the approximate I.H.P. of the main engines. (12)

12. Describe the Parsons Steam Turbine, and explain briefly the leading advantages and disadvantages of this type of machinery as compared with the reciprocating engine. (12)

FOURTH YEAR.

MECHANICAL ENGINEERING LABORATORY WORK.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 12.

(*Figures give proportional marks.*)

(*Seven questions may be attempted.*)

1. How is the viscosity of a lubricating oil expressed numerically? Describe the method of determining this quantity experimentally. (10)

2. Give a general account of the results you have obtained in a series of trials on a simple non-condensing engine either (*a*) with a fixed cut off and variable speed or (*b*) at constant speed with various rates of expansion, stating the conclusions you draw as to the variation in the economy of such an engine. (12)

3. In a certain gas engine trial the following figures were obtained:—

Average I.H.P.	98.0
Total gas per hour	1236 cubic feet
Calorific value of do.	900 B.T.U. per cu. ft.
Total jacket water per hour	4170 lbs.
Rise in temp. of do.	85.1° Fah.

Make a heat account for the trial and state what further information would be required in order to render such an account complete. (15)

4. In a test of a Lancashire boiler fitted with an economizer the following were the results:—

Average absolute steam pressure	93.8 lb. per sq. in.
" temp. corresponding	323.1° Fah.
" temp. of feed entering economizer	83.5° "
" temp. of feed entering boiler	226.3° "
" weight of water evaporated per hour	3,552 lbs.
" weight of coal fired per hour	336 lbs.
" calorific value of do per lb.	14,200 B.T.U.
" temp. of air in boiler room	98° Fah.
" temp. of gases entering economizer	566° "

Average temp. of gases leaving economiser	372° "
" weight of air used per lb. of coal	37.3 lbs.
" Radiation loss per hour	342,000 B.T.U.
Value of Kp. flue gases	0.238 "
" of L. for 323.1°F.	887.3 "

Find (*a*) the efficiency of the furnace, (*b*) the efficiency of the boiler alone, and (*c*) the efficiency of the economizer. (20)

5. A triple expansion pumping engine having three single acting pump plungers gave these figures:—

I.H.P. of steam cylinders	783
Area of each pump plunger	855 sq. in.
Stroke of each pump plunger	60 in.
Average revolutions per min.	21.18
Water pressure in discharge pipe	81.5 lbs. per sq. in.
Vacuum in suction pipe	2.8 lbs. per sq. in.
Height of disch. pipe gauge above suction gauge	9.8 feet

Find the mechanical efficiency of the engine, if the slip of the pump is neglected. (15)

6. In a calorimetric test of a sample of coal the following figures were obtained:—

Weight of water in calorimeter	5.5 lbs.
Water equivalent of calorimeter	0.5 lbs.
Temp. of water at beginning of ignition	30.0°C.
Temp. of water at end of ignition	31.0°C.
Time taken to burn sample	10.0 min.
Mean radiation loss	0.03°C. per min.
Original weight of crucible and dry coal	8.984 grammes
Weight of crucible, ash and unburnt coal after burning	8.579 "

Find the calorific value of the coal in B.T.U. per pound. (15)

7. The belt and brake pulleys of the belt tester are 27¾ inches diameter. During a run, the torque measured on the dynamometer was 1450 lbs. ins. and the effective load on the weighing machine was 97¼ lbs. The sum of the pull on the tight and slack sides of the belt was 110 lbs.

Find the efficiency of the transmission.

If, during the above test, the belt was on the point of slipping, find the coefficient of friction between the belt and the rim of the pulley.

Take the arc of contact as one half the pulley circumference. (20)

8. How would you make tests as to the relative excellence of two samples of piston-rod packing? (12)

9. An air compressor requires 2 effective H.P. per pound of air compressed per minute. The air is used in a motor furnished with a gas-fired preheater and giving the following results:—

B.H.P. of meter	10.2
Air used per minute	9.85 lbs.
Temp. of air entering preheater	180° Fah.
Temp. of air leaving preheater	390° "
Gas used per minute	1.68 cu. ft.
Calorific value of do. per cu. ft.	350 B.T.U.
Kp. for air	0.238 "

What is the efficiency of the whole system, and what is the efficiency of the preheater? (15)

FOURTH YEAR.

THERMODYNAMICS.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

(*Figures give proportional marks. Eight questions may be attempted*).

1. State and prove Carnot's Principle. (10)

2. Explain by the aid of a diagram the various ways in which energy is expended when heat is employed in warming and evaporating water. (10)

3. Find an expression for the greatest amount of work which can be done, per lb. of steam, under ideally favourable conditions, by an engine taking steam from a boiler at temperature τ_1 and restoring condensed water to the boiler at temperature τ_2 (12)

4. Steam of 97 p.c. dryness at a pressure of 115 lbs. per sq. in. abs. is throttled and reduced in pressure to 80 lbs. abs. without loss or gain of heat. What will be its final dryness?

$L_1 = 876.3$ $L_2 = 895.6$ $h = 308.7$ $h_2 = 281.4$ (10)

5. An ammonia compression refrigerating machine (having no expansion cylinder) works with adiabatic compression. The temperature limits are 10° and 80° Fah. Draw a temperature = entropy diagram for the cycle, and calculate approximately from it the cooling effect per (compressor) I.H.P. per hour. Assume that the ammonia is dry saturated vapour at the end of compression.

Entropy of liquid at 80°F. $= +0.1023$
" " " 10°F. $= -0.0501$
" vapour " 80°F. $= +0.9193$ (20)

6. In a gas engine receiving and rejecting heat at constant volumes V_1 and V_2, and having adiabatic expansion and compression, show that the efficiency is

$$1 - \left(\frac{V_1}{V_2}\right)^{\gamma - 1} \qquad (10$$

7. On the supposition that the specific heats of a gas are represented by the expressions

$$K_v = a + s\tau \text{ and } K_p = b + s\tau$$

(where a, b and s are constants.)
show that for any adiabatic change

$$v^b \, p^{ae\frac{s}{c}} pv = \text{constant.} \qquad (15)$$

8. A slab of metal of known conductivity and capacity for heat has one face subjected to a simple harmonic fluctuation of temperature. Sketch a diagram showing the temperature of the metal at any instant at various depths. Prove that at any instant the rate of change of the temperature gradient as the depth increases, is proportional to the rate of increase of temperature with respect to time. (20)

9. Explain how to determine the "missing quantity" in the trial of a steam engine. What causes influence the magnitude of this quantity? (15)

10. Show that in a perfect gas the molecular kinetic energy of translation in unit mass $= \frac{3}{2} c\tau$ (15)

11. In the case of air flowing in a long pipe show that approximately

$$19{\cdot}85\ \frac{d^4}{W^2}\cdot\frac{P_2^2 - P_1^2}{P_1 V_1} + 0.012\ \frac{L}{d} = 0$$

(coefficient of friction is taken as 0.003). (20)

METALLURGY

FOURTH YEAR.

ELECTRO-METALLURGY.

WEDNESDAY, APRIL 15TH, 1903:—MORNING, 9 TO 12.

1. What is the main principle on which the electrolytic refining of metals is based. How is it, for example, that although from a sulphuric acid solution, silver is deposited more readily, and iron less readily than copper, we can yet obtain pure copper at the cathode from an anode containing these three metals.

2. Describe generally the plant and conduct of an electrolytic copper refinery. Give some idea of the size, output and electrical power of a modern refinery.

3. What is the usual current density and voltage employed in copper refining, and what would be a suitable composition and temperature for the electrolyte. Discuss shortly the effect of a considerable increase or decrease in the current density and mention a case in which a very high current density is employed.

4. Compare the cost of electrical heating in a furnace having an efficiency of 70% with that of coal heating in a furnace having an efficiency of 20 %. Electrical energy costs $20 per horse-power year of 8000 hours. Coal of 7600 centigrade calories costs $4 per short ton.

1 Joule = 0.24 gram centigrade calories.

1 horse power = 746 Watts. 1 lb. = 453 grams.

5. Describe carefully how you would obtain, by an electrolytic method, commercially pure gold and silver from an alloy containing 10 gold, 85 % silver the remainder copper with a little lead.

FOURTH YEAR.

METALLURGY.

GOLD, SILVER AND LEAD.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

1. Mention any important differences between the roasting of lead and of copper ores, and between the furnaces employed for roasting lead and copper ores.

2. Describe with sketches a blast furnace for smelting lead ores. Mention any important differences between a lead and a copper blast furnace and give reasons for these differences.

3. Under what conditions would you smelt lead ores in a reverberatory furnace. Describe with equations, the reactions that take place during the different stages of the operation.

4. Enumerate the different commercial methods of extracting silver and gold from lead bullion. Describe *each* in a few words and give a clear account of *one* of these processes.

5. Represent, by means of diagramatic schemes, three of the more important methods of "parting" alloys of gold and silver.

What are the relative advantages of the methods you indicate?

6. Represent fully, by means of a diagram, the Russell process for extracting silver from its ores. Give in writing some further particulars with regard to the roasting and leaching of the ores.

FOURTH YEAR.

METALLURGY (ADVANCED).

MONDAY, APRIL 13TH, 1903:—MORNING, 9 TO 12.

1. Mention the more important chemical and physical properties of zinc which render difficult the extraction of this metal from its ores. State how these difficulties are overcome in the ordinary method of treating

zinc ores and give a clear description of the operations involved in obtaining zinc from blende.

2. Write a short account of the metallurgy of tin.

3. Give an account, illustrated by a diagramatic scheme, of the Mond process for extracting nickel from Sudbury nickel copper matte.

4. Describe carefully the method of obtaining mercury from its ore; sketch and describe a good form of furnace for this purpose.

5. Obtain a formula for the velocity of flow of hot air up a chimney, neglecting friction. How many cubic feet per second of furnace gases will pass up a chimney 100 feet high and 4 feet internal diameter supposing that the gases are at 300°C., the external air at 15°C. and the frictional resistance of the furnace and flues are equivalent to a pressure of 0.5 inches of water opposing the passage of the gases.

One cubic foot of air weighs 0.081 lbs. at 0°C.

One cubic foot of furnace gas weighs 0.084 lbs. at 0°C.

One cubic foot of water weighs 62.4 lbs.

Make the usual allowance for the friction of the gases in the chimney.

MINERALOGY

THIRD YEAR—(*Chemistry and Mining Courses*).

MINERALOGY.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 1.

1. Give the symbols of Naumann and the indices of Miller corresponding to each of the following expressions:—

$$\infty a : \infty a : a \qquad \infty a : b : \infty c$$
$$2a : b : 3c \qquad a : b : \infty c.$$
$$\frac{3}{2}a : b : 3$$

2. Explain the relationship of unit, brachy and macropyramids and prisms in the Orthorhombic system.

3. Give the characters of the Monoclimic system of Crystallography.

4. Explain any five of the following terms:—Hemimorphism, Isomorphism, Centrosymmetry, Dendritic, Botryoidal, Biaxial.

5. Give a classification of the Natural Oxides, naming the principal members of each group.

6. Name some of the principal Sulpharsenites and Sulphantimonites, and briefly describe one member of each group.

7. Briefly describe Sphalerite, Pyrrhotite, Cuprite, Spinel, and Limonite.

8. Describe the principal reactions obtained by heating minerals in closed tubes, or in open tubes, and state what they indicate.

9. What are the principal reactions of the following elements, as employed in determinative mineralogy:—Arsenic, Calcium, Fluorine, Manganese, Sulphur, Titanium?

10. Give the blowpipe reactions of each of the following minerals:—Stibnite, Cinnabar, Chromite, Cassiterite, Manganite.

11. Describe two of the crystal models shown, giving the notation of the faces. Name also and describe any five of the mineral specimens.

MINING ENGINEERING

THIRD YEAR.

MINING.

APRIL, 1903.

1. Describe and sketch some well-known form of percussion rock drill which uses steam or compressed air for power.

2. Name and describe briefly the general types of valve mechanism used on rock drills, and state the characteristics of each (rate of stroke, force, etc.).

3. Describe very concisely one of the best recent forms of rock drill, and state the present status of electric drills as compared with air drills.

4. What are the important points of difference between high and low explosives? What is the nature of an explosion in each, and at what rate does the shock pass through the substance of the explosive in each case?

5. What is the difference between Gelignite and ordinary 40 p.c. dynamite? What is the strongest explosive used in mining?

6. What is a detonator, and what are its functions in blasting? Why are larger detonators required in some cases than others?

7. If you were sinking a rectangular shaft 6′ × 10′ in cross section, through hard homogeneous rock, how would you place the blast holes and in what order would you shoot them?

8. Describe the construction, use and "clean up" of a sluice in Hydraulic Mining and state the conditions under which one or more drops and under-currents could be added with advantage.

9. Give detailed description of the machinery of a modern gold dredge, and explain the devices ordinarily used to catch the gold.

10. Explain the method in which the above described dredge would be used on a group of claims situated in a gravel flat one mile from a river and 20 feet above the mean level of the water in the river.

THIRD YEAR.

ORE DRESSING.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.30.

Figures in [ ] *show the maximum number of marks which may be given for each question.*

1. Define Ore Dressing and show why it is usually necessary to dress minerals. [5].

2. Enumerate in the order of their usefulness the characteristics which are of considerable importance in separating minerals, and explain briefly the method of making use of each. [5].

3. Show the derivation of the so-called Rittinger formula for the free fall of spheres in still water, and explain why it is only approximately true for spheres of mineral or ore. [10].

4. Show why this free sphere formula is not directly applicable to ore-dressing problems.

State the conditions which really exist in classifying, and state the approximate relation of actual results to the theoretical free sphere. [10].

5. Describe in detail the experimental determination of the size and velocity ratios of two minerals as recently carried out in the laboratory. [10]

6. If galena of an average diam. of 0.6 mm. just settles in an upward current of 140 mm. per sec., and calcite of an average diam. of 0.8 mm. just settles in a current of 68. mm. per sec., what are the largest grains of calcite that can be separated from galena grains ranging from 4 mm. diam. to 1 mm. diam. [10].

7. Describe some well-known form of jaw rock-breaker, explain its action in detail and state the approximate capacity per horse power. [5].

8. Compare breakers having overhung jaws with those having underhung jaws (Dodge type) in respect to quantity and quality of output, consumption of power and wear and tear per ton of rock crushed. [5].

9. Describe a steam stamp, and state approximately its consumption of water and power, its output and the cost of crushing per ton. [5].

10. Describe two fine crushers, one especially effective on hard rock, the other on soft, and show that each would be unsatisfactory for crushing rock of the other sort. [5].

11. Compare jaw and spindle breakers and show the advantage of each. [5].

12. Show the relations that exist between the diameters of a pair of rolls, the diameter of the maximum rock fed and the diam. of the max. lumps produced. [7].

13. Two similar crushers may be run on the same rock, one fed free and the other crowded full; show what happens in each case and compare the work done in quantity and quality, and the power consumption. [5].

14. Describe very concisely the different kinds of screens commonly used and the most important mechanical devices for operating them, and state the approximate max. and min. dimensions of each kind of screens. [8].

15. What is the practical minimum size of screen? Why is this the case and what device is used on finer material? [5].

FACULTY OF APPLIED SCIENCE.

FOURTH YEAR.

ORE DRESSING AND MILLING.

WEDNESDAY, DEC. 17TH:—AFTERNOON,

1. Describe the action and discuss the governing principles in the case of a multiple compartment jig working on an ore with two valuable minerals in a simple gangue.

Compare this case with that of simple jigging with one mineral in a simple gangue.

2. Describe some form of quick return slime table, name the several adjustments and state and discuss the effect of each.

3. Given a silicious ore containing 10 p.c. of copper iron sulphides with some free gold. (Cu. 3 p.c. Au. 0.3 oz.).

Outline a concentrating mill of about 200 tons capa-

city and state the several pieces of apparatus, their sequence, and the approximate sizes and quantities of material going to each.

4. Given 100 tons a day of an ore of quartz with considerable clayey material. The whole assaying 0.8 oz. gold.

The ore yields 50 p.c. of its gold to stamp milling without concentration and 30 p.c. to direct cyaniding of the mill tails.

Outline the whole plant and describe in detail the leaching method employed.

5. Give a concise but comprehensive description of a typical case of either hydraulic mining or gold dredging.

FOURTH YEAR.

MINING.

WEDNESDAY, APRIL 8TH, 1903:—MORNING, 9 TO 1.

1. In the following case of prospecting by deep drilling, what kind of a drill would you use, how many holes would you plan, how would you lay them out, and how much would you expect them to cost per foot.

Assume a property 1000 ft. square supposed to lie centrally over the axis of a saddle reef. The country is moderately hard slate and the axis of the reef is supposed to be about 300 ft. below the surface and almost horizontal, while the sides, after rounding, are supposed to dip about 60° on each side of the center line.

2. What is the difference between gelatine dynamite and ordinary 40 p.c. dynamite, and what are the conditions under which each may be used with great advantage? What is detonation and how does it differ from a lower order of explosion?

3. In a mine 1000 ft. deep and liable to encounter heavy rushes of water, what type of pumps would you recommend and what would be your method of guarding these pumps against drowning. You may assume an ample steam plant at the surface near the shaft.

4. Compare tail rope and endless rope haulage and set forth the advantages and disadvantages of each.

5. Explain the parts played by gas and coal dust in mine explosions and show the value of "safety" explosives in this connection.

6. In the case of a coal seam 6 ft. thick lying 500 ft. deep under the western boundary of a property one mile square. If the coal dips 5° to the east and the surface of the property is approximately flat, and is barren and not very wet,

(*a*) Where would you place your shafts; (*b*) what would be the diameter of the shaft and barrier pillars; (*c*) describe in detail the complete method of working out one group of rooms or section of long wall.

7. In the case of a mine on a large mass of rather soft ore in country which will not stand well, show how you would work the deposit by the method of square setts or by some modification of this method which will require less timber.

8. In a large mine as above, in which three levels 100 ft. apart are all being worked at once, show how and to what extent a system of ore pockets at each level may increase the hoisting capacity of a given set of engines, as compared with direct loading at the same three levels.

9. In the case of a mine already developed to 500 ft. on a chute of concentrating ore. Assume the mine to be in operation with an equipment of good second rate machinery capable of putting out 150 tons a day. Assume also a fairly good concentrator belonging to the mine with sufficient capacity to handle the full output.

What would be your procedure if called upon to examine, assay, and report on the mine and mill with a view to valuing the property for clients holding a three months' option.

10. Assume that your examination above shows 100,000 tons of ore "in sight" and that drill holes and "one sided" exposures show what will probably develop into another 100,000 tons, and that you have no present means of judging of the more remote prospects of the mine.

If the ore assays $13, the tails assay $1.50 and the operating costs are $3 for mining, $2 for milling, $1.60 for freight and smelter charges, and 40c. for general expense and profit and loss,

(*a*) What sum would you think a fair price for the mine?

(*b*) If it could be shown that 60 cents a ton could be saved in operating costs and better recovery, by spending $100,000 in renewing and remodelling mine and mill machinery, what would you advise the owners and why?

FOURTH YEAR.

MINING AND METALLURGICAL MACHINERY AND MINING *vs.* METALLURGY OPTION.

THURSDAY, APRIL 9TH, 1903:—MORNING, 9 TO 1.

NOTE.—*Students who have taken the Mining option are to answer questions 1-10 inclusive.*

Students who have taken the Metallurgy option are to answer questions 1-6 inclusive and 11-14 inclusive.

A.

Assume the case of a mine on a large body of silicious pyrrhotite and chacopyrite in somewhat shattered ground. Development has proceeded to 500 ft. and has proved 750,000 tons of shipping ore. Drilling below 500 ft. has given evidence of the continuity of the ore body to 800 ft. at least, but a characteristic of the locality is that ore bodies seldom hold their size below 1000 ft.

The mine which makes 200 gallons of water per minute had been laid out for a daily output of 500 tons on a system of square setts combined with filling, but a fire destroyed the whole surface plant and caused a complete temporary abandonment.

The mine produces smelting ore only, and lies in rough country 4 miles from and 1000 feet above a river

along which runs a railway. At a point 5 miles from the mine it is practicable to build a dam and generate sufficient power to operate the mine at all seasons.

The problem is to equip the mine for a daily output of 600 tons, to provide a line of transportation from mine to rail, and to build a power plant and electric transmission line sufficient to serve the whole property.

The solutions must be given under the following 6 heads:—

1. Specify the general features of the hoisting plant, the types of engines used and the approximate power consumption.

2. (*a*) State the probable number of rock drills required and specify the type of air compressors and the approximate power consumption.

(*b*) Specify the type of pumps used and their approximate power consumption.

3. Specify the general features of the transportation line from mine to rail, and describe briefly the loading and unloading stations and the ore pockets at the rail. State also the approximate power consumption of the transportation system.

4. Assume the dam and hydraulic plant completed and specify the general features of the electric plant, namely, the type and approximate size of the dynamos and their voltage, the general features of the transmission line, the types of the several main motors required, etc. State also the approximate efficiencies of the several parts of the system.

5. Explain briefly the method of wiring of some one of the important motors used and show its advantage as compared with those of some other well known type which might be used for the same service.

6. Assume what ever drop you consider commercially justifiable and determine the size of wire needed for the transmission line.

Mining Option.

7 and 8. Asume the practicability in the above case of getting an ample supply of good steam coal delivered by rail at 5 dollars per ton, and take the cost of a

boiler plant at 30,000 dollars (not including engines) whereas the water power plant and dam would cost 250,000 dollars (exclusive of dynamos and other electrical machinery).

Compare steam power with hydraulic electric power and demonstrate the superiority of one to the other under the circumstances named.

B.

9 and 10. Assume the case of a coal mine requiring a total air current of 90,000 cu. ft. per minute. Split into three courses, *A*, *B*, and *C*, which require 40,000, 20,000 and 30,000 cu. ft. of air respectively.

If *A* is 7 × 9 ft. 5,000 ft. long, *B* is 6 × 8 ft. 8,000 ft. long, and *C* is 5 × 10 ft. 3,000 ft. long which splits must be regulated and what sized openings must be used in the box regulators?

METALLURGY OPTION.

11. Give a concise description and specify the approximate dimensions of a blowing engine capable of supplying air for an iron blast furnace making 120 tons of pig iron per day from average ores of about 55 p.c. iron.

Assume the steam pressure to be 120 lbs. per sq. in. and deliver the air to the stoves at 12 lbs. per sq. in.

12. In what way has information been obtained with regard to the constitution of alloys. Draw complete equilibrium curves (1) for a series of alloys which form simple solutions; (2) for a series of alloys containing one or more compounds. (Take an ideal case if you cannot give an actual one.) Explain carefully what the different lines in the diagram represent and show what happens during the cooling of an alloy.

13. Enumerate the different microscopic constituents that exist in steel. How would you recognize them under the microscope? Draw the equilibrium curves as fully as you can for the carbon iron series, and explain as far as you are able, by means of this diagram, the manner in which the constituents of steel are formed. In what class of steel and after what kind of treat-

ment would you expect to find each of these constituents?

14. For what purposes are chrome steels, nickel steels, and manganese steels specially suited. Give a short account of the composition and of the mechanical and physical properties of these steels.

PHYSICS (EXPERIMENTAL)

FIRST YEAR.

EXPERIMENTAL PHYSICS—SOUND, LIGHT AND HEAT.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. Find the absolute zero on the Fahrenheit and on the Réaumur Scale.

2. How would you determine the latent heats of water and steam? It is found that a kilogramme of water at 100°C. mixed with a kilogramme of melting ice without loss of heat, gives two kilogrammes of water at the temperature 10.36°C.; find the latent heat of water.

3. Describe the Regnault hygrometer. How would you calculate the relative humidity from a knowledge of the dew point?

4. Explain what is meant by critical temperature and pressure. How were the permanent gases liquified, and what are the necessary conditions for obtaining liquid air in quantity?

5. Find the quantity of heat conducted per hour through each square meter of the surface of an iron steam boiler 0.8 cm. thick, when the temperature of the inner surface of the boiler is 120°C. and that of the outer 119.5°C. The conductivity of the iron may be taken as 0.19 in C. G. S. units.

6. Describe and explain the action of (*a*) Crookes' radiometer, (*b*) Boys' radiomicrometer.

7. State the first and second laws of thermodynamics.

8. How would you calculate the maximum work that could be obtained from a perfect heat engine?

9. Describe the method of comparing the values of the velocity of sound in different gases by means of Kundt's Tube, explaining the principles on which it depends. Could this method be adapted to compare the velocities in wood, glass, and the different metals?

10. Given a Spectrometer, a prism and a sodium flame. Describe carefully (*a*) the preliminary adjustments to be made, (*b*) the method of finding the angle of the prism, and (*c*) how to measure the minimum deviation for sodium light. Give the formula by which you could then calculate the index of refraction of the prism for sodium light.

11. Describe some form of Photometer, and explain the principle on which it depends.

12. The length of a violin string is 33cms. and its mass is: .524gm. What tension must be applied to it to make it vibrate 280 times per second?

SECOND YEAR.

EXPERIMENTAL PHYSICS.

ELECTRICITY AND MAGNETISM.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

1. State what you know of the Leyden Jar discharge. How would you measure the period of oscillation of the discharge? Describe the arrangement of the Leyden jars and connections in the experiment of the "alternative path."

2. Define the term "surface density of electricity."

How does the distribution of electricity depend on the shape of a conductor?

Explain the discharging action of points and its application to protection of buildings from lightning.

3. Describe the action of (1) a simple type of Hertzian vibrator, (2) a coherer.

4. Show by careful diagrams the distribution of magnetic lines of force round (*a*) a long straight wire, (*b*) a circular coil, (*c*) a solenoid through which electric currents pass.

Find the strength of the magnetic field, (*a*) at the axis, (*b*) at the end of a solenoid 50 cms. long, 2 cms. in diameter wound with 1000 turns of wire and carrying a current of 5 amperes.

5. Show how the magnetism developed in iron depends on the strength of the magnetizing current.

What is meant by magnetic hysteresis?

Contrast the magnetic properties of soft iron and steel.

6. What is the effect of temperature on the electrical resistance of metals, alloys and electrolytes? How would you determine the temperature coefficient of copper wire between 0°C. and 100°C?

7. Four large storage batteries in series, E.M.F. of each 2.2 volts and internal resistance of each .002 ohms, send a current through two external resistance of .1 and .01 ohms arranged first in series and then in parallel. Find in each case the current drawn from the cells and the watts absorbed in the resistances.

8. State Farady's laws of the induction of electric currents.

An earth coil mounted on a horizontal axis placed in the meridian is rotated at a uniform speed. Find

(*a*) The E.M.F. induced in the coil at each position in its revolution;

(*b*) The average E.M.F.

9. Find (*a*) the magnitude and direction of the force experienced by straight vertical wire 20 cms. long carrying a current of 20 amperes in a uniform horizontal north and south field of 6000 lines per square centimetre.

(*b*) The E.M.F. produced in the same wire when it is carried due east in the field at a rate 5 metres per second.

10. Describe the construction and action of an alternating current transformer.

What type of transformer is used for electric weld

What type of transformer is used for electric welding?

11. Describe and explain the action of any *two* of the following:

(*a*) Electromagnetic interrupter of an induction coil;

(*b*) Wehnelt interrupter;

(*c*) Telegraphic relay.

SURVEYING AND GEODESY

SECOND YEAR—(*Civil and Mining*).

SURVEYING.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.30.

1. A surveyor has two 100 ft. chains of exactly equal length, one a band and the other a link chain. The band weighs 2 lbs., and the link chain 11 lbs. Calculate the difference in length, due to sag only, that he will find when measuring 1500 ft. with both chains, using a pull of 20 lbs., and lengths of 100 ft.

2. Prove the general equation of the polar planimeter. When does the result obtained from the instrument not give the correct area? Supposing a planimeter to be adjusted to measure in units of 1 sq. in., what alteration would be necessary to make it measure in units of 2 sq. ins.?

3. Explain the principle of a vernier. Why is its use necessary? Determine the total length and number of divisions on a vernier designed to give readings to 15 seconds from a circle divided to 20 minutes.

4. Obtain the general equations used in reducing the observations taken on a stadia survey. (*a*) The following readings were taken to the corners of a quadrilateral with a transit whose stadia constant was 99.0 and whose $(f + c) = 1.4$ ft. Calculate the area of the figure.

Bearing.	Vert. Angle.	Stadia Interval.
282° 35′	+ 14° 50′	2.87
316 40	— 9 17	1.45
56 20	— 2 19	1.32
173 10	+ 6 30	3.99

5. State what adjustments are required to put the compass given you in perfect working condition. Mention each test made. State in what direction the part must be moved when adjustment is required.

6. Explain the advantages of using the traverse method when making a transit survey. The following bearings were taken with a surveyor's compass when the magnetic declination was 9° 30′ W. Give the bearings as they would have been read on a transit traverse, the instrument having been set to read 0° when pointing in the direction of astronomical north.

(1) N. 16° 30′ E. (2) N. 41° 20′ W. (3) S. 7° 20′ E. (4) S. 6° 15′ W. (5) S. 72° 20′ W.

THIRD YEAR.

PRACTICAL ASTRONOMY.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

1. Find the local mean time corresponding to $11^h\ 30^m\ 0^s$ sidereal time in Montreal on April 7, 1903. (*a*) Find the local mean time at the same instant in longitude $4^h\ 38^m$ East. The longitude of Montreal is $4^h\ 54^m\ 18.67^s$.

2. What corrections are to be applied to an observed altitude of the sun at sea? (*a*) The meridian altitude of the sun's lower limb on January 1, 1903, was observed in longitude 3 hours West to be 30° 10′ 15″. Eye of observer 30 ft. above the level of the sea. Find the latitude.

3. Polaris was observed to have an altitude of 43° 44′ 20″ on March 1, 1903, at $10^h\ 30^m$ sidereal time. Find the latitude of the place. (N.A. method).

4. Ursae Minoris (p. 418, N.A.) was observed, from a point in latitude 43° 20′ N., on March 7, 1903, to have an altitude 40° 11′ 08″. Represent on a diagram the quantities available for calculating azimuth. Give the formula you would employ for this purpose and the values of the angular quantities required for the calculation.

5. State briefly the method of determining latitude by the zenith telescope and obtain the formula for the reduction of the observations.

6. Calculate the azimuth of δ. Ursae Minoris when at greatest elongation on December 20, 1903 (p. 337, N.A.). Latitude N. 45° 30′.

7. What is the general equation of the transit instrument in the meridian? State how each of the quantities in it is to be obtained.

THIRD YEAR—(*Mining Engineering Course*).

TRANSPORTATION.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

1. Mention what features you would take into consideration when choosing a location for a common road to a mine.

(*a*) There are two possible locations for such a road, one being 4.9 miles long with 5 per 100 grades, and the other 7.4 miles long with 2 per 100 grades. The roads would cost $2,500.00 per mile when graded and finished with a good earth travelling surface. Assuming the weight of a waggon to be 1,800 lbs. and the tractive power of a horse to be 125 lbs. at a speed of 3 miles per hour and to vary inversely as the speed, calculate which would be the better road to build for the transportation of 8,800 tons of ore. Wages for team and driver, $3.50 per day.

2. A locomotive has the following dimensions:—Diam. of cylinder 20″, stroke 26″, diam. of driving wheels 72″, weight on driving wheels 123,000 lbs., total weight of engine and tender 258,000 lbs., boiler pressure 200 lbs., per sq. in.

(*a*) What is its maximum tractive power? (*b*) Assuming that it can develop a mean effective pressure of 85 p.c. boiler pressure at a speed, of 10 miles per hour, and that its tractive power varies inversely as its speed, what is its tractive power at a speed of 35 miles per hour?

3. When relocating a piece of railroad, it was found that by increasing the length by 2,300 ft. and the curvature by 85°, the summit could be reduced by 55 ft. The grades at the summit are the ruling grades on the

line and the traffic is 35 trains each way per day. What amount could profitably be spent in constructing the new line?

4. What is "momentum?" Give a formula for calculating the equivalent velocity head. (*a*) Assuming the locomotive in question (2) to be running up a grade of 0.80 per 100 and around a 2° curve at a speed of 40 miles per hour, calculate how far it would run before the speed was reduced to 35 miles per hour, the total weight of the train being 1,100 tons.

5. Give a statement of the principal items in a construction estimate for a Canadian road, with a full explanation of how you would obtain the quantities for each item in any particular case.

6. How is the Railway Committee of the Privy Council constituted? Mention the engineering questions that must come before it for settlement.

THIRD AND FOURTH YEARS—(*Civil Engineering*).

RAILWAY ENGINEERING.

FRIDAY, APRIL 17TH, 1903:—MORNING, 9 TO 12.30.

The blue print shows the condensed profile of an operating division of a railroad, giving mileage, grades in feet per mile, and curvature. The freight is principally grain and is hauled in freight cars of 60,000 lbs. capacity and 34,000 lbs. dead weight. The locomotives have the following dimensions: weight on drivers, 123,000 lbs.; total weight engine and tender, 258,000 lbs.; diameter of driving wheels 72″, stroke 28″; diameter of cylinders 20″; boiler pressure 200 lbs. with a mean effective pressure of 85 p.c. at 10 m.p.h.; weight of caboose 24,000 lbs.

1. What is the maximum weight of train that one locomotive can haul over the division in both directions with a minimum speed of 10 m.p.h.?

2. If the ruling grade were reduced to 25 ft. per mile what would the saving in operating expenses be when hauling 15,000,000 bushels against the mileage and returning light? Cost of a train mile 85 cents.

3. Supposing the ruling grade to have been reduced to 25 ft. per mile, design a station yard for Beaverton capable of holding three road trains and 10 cars of local freight. The town lies to the right of the train and the total angle of the curve is 60°. Make the drawing to a scale of 100 ft. to the inch showing land, required position of buildings, arrangement and length of tracks, position of switches; also a profile to scale of 100 ft. = 1 in. horizontal and 10 ft. = 1 in. vertical showing your grade line.

4. Explain why vertical curves are used and give the theory by which their length is sometimes calculated. Calculate a vertical curve with a rate of change of 0.12 per 100 ft. connecting the grades at M.P. 160; these would intersect at sta. 845 + 00 with an elevation of 640.0.

5. It is proposed to cut 16 ft. off the summit at M.P. 160. Assuming that money can be borrowed at 5 p.c. and that there is a daily traffic of 9 trains per day each way, calculate the amount that can be economically expended in cutting off the summit.

6. Give a brief description of how you would proceed to make a railway location between Richmond and Montreal mentioning all the information that you would consider to be necessary and explaining how you would obtain it.

7. Give the general principles upon which an interlocking plant is designed and enumerate its principal parts, explainng the duty of each.

FOURTH YEAR.

GEODESY.

WEDNESDAY, APRIL 8TH, 1903:—AFTERNOON, 2 TO 5.

1. Define "Probable error of an observation."

(*a*) The longitude of the transit pier, McGill College, was determined in 1884, from Harvard College Observatory as $4^h\ 54^m\ 18.54^s + {}^s.045$. In 1892 the longitude was found, by direct telegraphic connection with Greenwich, to be $4^h\ 54^m\ 18.67^s + {}^s.015$. What is the "weighted mean" and what is its probable error?

2. Obtain a formula for the correction for sag in the measurement of a base line by a steel tape, suspended at intervals.

(*a*) Assume the modulus of the tape to be 27,000,000; the sectional area .0144 sq. in.; the weight per foot run .0046 lb., and find the pull which will balance sag in a length of 50 feet.

3. Outline on the accompanying map a system of primary triangulation for a survey of Canada, having in view the work already done in the United States. Give the character of the triangulation which you would suggest for use along each main chain. Show the positions of base lines and astronomically determined stations.

4. If "polaris" were observed at an altitude of 40°, for azimuth, and the inclination of the horizontal axis of the transit found to be 35″, what would the corresponding correction be?

(*a*) If the collimation error were 10″, what azimuth error would it represent?

5. Prove that in the reversible pendulum the centres of oscillation and suspension are interchangeable.

6. Give a brief account of the development of knowledge as regards the figure of the earth. (*a*) Upon what data does the present accepted form depend?

7. What are the essential points in which "precise" leveling differs from ordinary engineering levelling?

8. Adjust the following angles of a quadrilateral: $A_1 = 50° 20' 13''$; $A_2 = 48° 36' 26''$; $B_3 = 45° 10' 23''$; $B_4 = 34° 00' 33''$; $C_5 = 52° 12' 44''$; $C_6 = 63° 11' 52''$; $D_7 = 30° 34' 49''$; $D_8 = 35° 53' 08''$ for the angle adjustments and derive formulae by which to adjust them for the side equations, without disturbing the angle adjustment.

SESSIONAL EXAMINATIONS

FACULTY OF LAW

1903

SESSIONAL EXAMINATIONS

FIRST YEAR.

CIVIL PROCEDURE.

THURSDAY, APRIL 2ND, 1903:—MORNING, 9 TO 12.

Examiner,.. .. ..GORDON W. MACDOUGALL.

1. Define an action at law. Explain the nature of personal, real and mixed actions.

2. What are the conditions precedent to a valid action?

3. What are the powers and jurisdiction of the Superior Court:

1st. As a Court of first instance?

2nd. In Review?

4. What cases from this Province are appealable to the Supreme Court of Canada? Under what circumstances can a further appeal be taken to the Privy Council?

5. Give the general rules to be followed in the drafting of a declaration.

6. What is the general nature of an affirmative plea and of a partial demurrer?

7. Describe the different kinds of preliminary exceptions.

8. What is the nature of a proceeding in warranty? Describe the different kinds of warranty and explain the advantages of warranty proceedings.

9. What is examination on discovery? Who are subjected to this examination and when can it be resisted as of right?

10. What is the general nature of:

1. An incidental demand?

2. An intervention?

3. A commission for the examination of witnesses?

FIRST YEAR.

CONSTITUTIONAL LAW.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

Examiner,.. .. .. PROF. WALTON.

1. Explain the effects of the Cession of Canada upon the legal system.

2. What steps were taken by Lord Durham or in consequence of his Report, to remedy: (1) the waste of public money; (2) the condition of squatters; and (3) the evils due to "Clergy reserves?" Explain these grievances.

3. Compare the influence of the Canadian Senate with that of the House of Lords and the Senate of the United States.

4. Can the Lieutenant-Governor of a Province "reserve" a Bill, and, if so, in what circumstances.

5. What are the qualifications of a Senator?

6. It is desirable to make certain clauses form part of every policy of fire insurance. Can this be done by the Parliament of Canada? Explain.

7. What is direct taxation? Discuss some of the cases on the subject.

8. What do you mean by conventions of the constitution? Give examples.

9. What is meant by saying that the British Parliament is "sovereign"?

10. Explain, very briefly, the constitutional position of the Cabinet.

FIRST YEAR.

HISTORY OF LAW OF LOWER CANADA.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

Examiner, ...PROF. MCGOUN.

1. Explain briefly the origin of Customary Law in France, and state in what part of France it chiefly prevailed.

2. What other system of law besides customary entered into the formation of the Civil Law of France, and how were the two combined?

3. What was the Code Michaud, and discuss briefly whether it was legally binding as law?

4. What was the name of the Ecclesiastical Courts in the old regime, and what was the relation between civil and ecclesiastical law?

5. What relation does the Code Napoleon bear to the old French law and to our own law?

6. Give the substance of the provisions of the Treaty of Paris 1760 in reference to the religious worship of the inhabitants?

7. Under what auspices were the first civil and criminal courts organized after the full establishment of the British regime?

8. Mention certain ordinances between 1774 and 1791 in relation to law and judicial proceedings?

9. When did the Union Act come into force, and state what important laws were passed in 1854?

10. What tribunal has the right of trying election contestations, and when was their jurisdiction created?

FIRST YEAR.

OBLIGATIONS.

THURSDAY, MARCH 26TH, 1903:—MORNING, 9 TO 12.

Examiner,. . . . . MR. AIME GEOFFRION.

1. When is a stipulation in favour of a third party invalid? Give examples of valid and invalid stipulations in favour of third parties. What is the effect of the invalidity when it exists?

2. When, if ever, is such a stipulation revocable? If it is, who can revoke, and what is the effect of the revocation?

3. When does a contract for the alienation of a thing not transfer immediately the ownership (*a*) between the parties, (*b*) as regards third parties? In those cases what is necessary for such transfer?

4. Define a condition. Define the different kinds of conditions.

5. Give the difference between indivisibility and solidarity.

6. What is the effect of impossibility to execute an obligation; (1) when it existed when the obligation was created; (2) when it happened afterwards.

FIRST YEAR.

LAW OF PERSONS.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

Examiner,. . . . . GORDON W. MACDOUGALL.

1. Under what circumstances can an alien become a British subject within Canada? How can he renounce his British citizenship?

2. What are the legal effects of civil death?

3. What constitutes legal domicile? What conditions are essential to the acquisition of a domicile of choice?

4. What is the meaning of provisional possession in connection with the property of an absentee? What are the obligations of those in possession if the absentee returns?

5. What grounds of absolute nullity can be invoked to set aside a marriage?

6. What parties are considered to have a sufficient interest to invoke absolute nullity in the case of marriage, and what must be the nature of the interest in each case?

7. What obligations arise from marriage as between the consorts themselves?

8. What is the nature of an alimentary debt? Between what parties does the debt exist and how can it be satisfied?

9. What are the effects, as between consorts, of a judgment in separation as to bed and board?

10. What measures may be adopted by the plaintiff prior to obtaining a final judgment in such an action?

FIRST YEAR.

REAL PROPERTY LAW.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

Examiner, ... PROF. MARLER.

1. What is ownership? Give some of its attributes.

2. In whose interest is ownership limited? Give examples.

3. Distinguish between ownership and possession.

4. What is good faith in possession, and what is bad faith?

5. How do they differ as regards fruits?

6. What do you mean by fruits? Into what classes are fruits divided? Give examples of each kind. What difference is there as to their mode of perception? Explain the perception of civil fruits by an example.

7. For what improvements and expenses, even when they no longer exist, is the possessor entitled to be compensated? What expenses and improvements do you mean?

8. What is usufruct? What are the rights of the usufructuary over mines and quarries?

9. What inventory is the usufructuary bound to make? When? How?

10. What is the nature of the security he is bound to give?

11. What do you mean by a general usufructuary, *usufruitier universel?* How does he contribute to the debts?

12. What is the object of registration?

13. How it is effected?

14. What are the rights of the Emphyteutic lessor for the recovery of the rent? Can he act as in ordinary lease?

FIRST YEAR.

ROMAN LAW.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

Examiner,.. .. .. PROF. WALTON.

1. Explain briefly the rights of a *filius familias* as regards property.

2. What were the several kinds of *dos*, and what happened to them at the dissolution of the marriage?

3. What is meant by *fructuum perceptio* as a mode of acquiring property?

4. Explain clearly the difference between a servitude and a right under an obligation.

5. What was the right of *superficies?*

6. What was the Roman Law as to holograph wills?

7. Explain the law (*a*) as to a legacy of a *res aliena;* (*b*) of an immoveable which is subject to a hypothec.

8. A. who dies intestate after Justinian, leaves paternal grandfather, a maternal uncle, and a grand-niece, the grand-daughter of his brother. How is his estate divided? Is our law the same? Explain.

9. What was the *cautio damni infecti?*

10. In the *formula* what was the *intentio?*

SECOND YEAR.

CIVIL PROCEDURE.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

Examiner,.. .. ..PERCY C. RYAN, B.C.L.

1. Outline the procedure necessary to effect the sale of property belonging to minors.

2. What is meant by submission? Distinguish between *amiables compositeurs* (mediators), and ordinary arbitrators. What general rules must be observed by each? How are awards attacked?

3. What proceeding should be adopted when a number of persons act as a corporation without being legally incorporated or recognized? By whom is the

suit brought? Draft the first proceeding in the suit. On whom is it served, and how are costs collected?

4. State the rules governing the grant of prohibition.

5. What are the effects of sheriff's sales? In what cases can a deposit be exacted from bidders?

6. State what species of bail can be given by persons arrested under capias. Explain fully.

7. Describe the proceedings in cases of resale for false bidding. Draft the petition.

8. What persons can be examined, and in what cases, after judgment, in aid of execution?

9. Draft a complete opposition to withdraw in a seizure of moveables under execution.

10. Draft a petition for *habeas corpus ad subjiciendum.*

SECOND YEAR.

LAW OF CORPORATIONS.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

1. Define a corporation.

2. What were the names used in Roman and in early French Law for corporations?

3. What are the leading features of the declaration of 1743 registered by the Council of Quebec, regarding Mortmain?

4. What is provided by the General Clauses Acts of our modern law respecting the right of corporations governed by them to hold real estate?

5. What are the four important General Clauses Acts governing corporations organized under our law, and to what class of corporations do they respectively apply?

6. What are the formalities for the issue of preference stock and what species of preference can be given to its holders?

7. What are the different remedies given to a Company to enforce payment of calls from shareholders?

8. Out of what funds are dividends to be paid, and what funds are subject to prohibition for the payment thereof?

9. Is it legal to issue shares of a Company at a discount either during the ordinary operation of the Company or when it is in difficulties, and cannot sell the stock at par.

10. What is the provision of the Provincial Letters Patent Act as to subscription and payment of stock at the outset, and what are the provisions of the Canada Companies Act, 1902, on this subject.

SECOND YEAR.

PUBLIC INTERNATIONAL LAW.

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

Examiner,.. .. .. PROF. LAFLEUR.

1. What is the effect of a change of international status on the obligations of states:

(*a*) When a state is extinguished by being divided into two or more distinct states?

(*b*) When one state absorbs another?

(*c*) When a state, without losing its identity, loses a portion of its territory which is annexed to another state?

(*d*) When a severed part is erected into an independent state?

2. How was the "Monroe Doctrine" originally formulated in 1823, and what interpretation was given to it by the United States to justify its intervention in the delimitation of the boundary between Great Britain and Venezuela in 1895, and its abstention from intervening in the recent blockade of Venezuelan ports by Great Britain and Germany?

3. Give a brief sketch of the origin and of the present position of the controversy between the United States and Great Britain in regard to the Alaska boundary.

4. Upon what principles was the violation of territory excused in the case of the seizure of the "Caroline" in American waters by the Canadian forces in 1837?

5. Discuss the liability of the United States and Great Britain respectively for alleged breach of neutrality in:—

(*a*) The Fenian Raid;
(*b*) The St. Alban's Raid.

6. State the "three rules" adopted by the Treaty of Washington for the determination of the Alabama claims, and examine the question whether they modify the former practice of nations in regard to the responsibility of a neutral state for the acts of its subjects in building and arming ships of war for a belligerent and in supplying a belligerent with war material.

7. What are the effects of carrying contraband:
(*a*) On the vessel;
(*b*) On the innocent cargo?

8. During the Crimean war a French cruiser captured a Hanoverian ship on a voyage from Lisbon to Hamburg with a cargo, a portion of which was saltpetre. The French prize court found upon the evidence that the real destination of the saltpetre was Russia, and that it was uncertain whether the saltpetre was to be forwarded overland to Russia from Hamburg, or whether the ship, after discharging the rest of her cargo at Hamburg, would carry the saltpetre to a Russian port in the Baltic. Was the saltpetre seizable as contraband upon either theory?

9. Can a blockade be maintained against neutrals while relaxed against the belligerent? Can an effective blockade be maintained by a cruising squadron?

SECOND YEAR.

PRESCRIPTION, LEASE—MUNICIPAL.

THURSDAY, MARCH 26TH, 1903:—MORNING, 9 TO 12.

1. What exceptions are perpetual?
What prescription applies to interest or revenues received by an agent *quoad* his principal?
Quid of fruits and revenues received by a possessor in bad faith?
By an heir who is excluded from the succession by reason of unworthiness?

2. What are the special elements required in the ten years' prescription by subsequent purchasers?

Quid if the purchaser becomes in bad faith after the acquisition?

Quid after this prescription has been renounced or interrupted?

3. What is the prescription of the action against architects and contractors, based upon the warranty of the work they have done or supervised?

Explain the different systems upon the question.

4. What is the obligation of the lessor as to defects of the thing leased:

(1) Existing at the time of the lease?

(2) Occuring subsequently?

5. What is the obligation of the lessor as regards disturbances caused by third parties, in the exercise of their rights, or by public authority?

6. What are the rights of the lessor and of the lessee, upon the improvements and additions made by the latter during the lease?

7. What are the obligations of the lessor in a contract of lease or hire of work?

Those of the lessee?

8. At whose risk is the thing when the workman furnish labour and skill and materials?

When he furnish only labour and skill?

Quid of his rights to recover his salary in each case, when the thing is destroyed?

9. What persons compose a local council? A county council? A board of delegates?

10. What is the jurisdiction of the board of delegates? How is the board called upon to exercise their duties? Who acts as president? As secretary-treasurer?

SECOND YEAR.

REAL PROPERTY LAW.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

Examiner, ... PROF. MARLER.

1. Under what tenures is land in this province held? Wherein do they differ?

2. What changes has the Code introduced as to alienation by Contract? What part does registration play?

3. What are the various modes of acquiring ownership?

4. What formalities, as to third persons, must be accomplished in the case of transmission of ownership by death?

In the absence of these formalities, what effect has a real right granted by the owner.

5. As regards the transfer of ownership, wherein does a promise of sale differ from a sale?

6. How is land forming part of an official number described? What is the effect of the registration of a deed of sale of land when no official number is given and the official plan is in force? Can the defect be remedied and how? From what time does the registration avail?

7. How can a wife sell her own land when her husband refuses to authorize her:

(*a*) When she is separate as to property;

(*b*) When she is common as to property?

8. What claims give a purchaser the right to withhold the price? To what extent can he withhold?

9. What security has the Vendor for the payment of the price due him? How preserved?

10. What is the effect of a Sheriff's sale on the real rights upon the land sold?

What rights does it not purge?

11. Of what is the prosecuting creditor the warrantor in case of a sheriff's sale?

SECOND AND THIRD YEARS.

COMMERCIAL LAW.—(*First Paper.*)

INSURANCE—CARRIERS—BANKING.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

Examiner,. . . . . PROF. SMITH.

1. A merchant, believing his stock to be worth $15,000, insures it with each of three Insurance Companies for $5,000. The stock is in reality worth only $7,500. By a fire it is damaged to the extent of $4,500.

What is the liability of the several companies?

2. A steamer is built for a navigation company and is to be delivered on the 1st May ensuing. The builders insure it for its full value. A sub-contractor having a lien upon it for the amount due him, insures it for the amount of his claim. The navigation company insures it for the amount of the prospective profits of the first season's running. A loan company insures it for the sum advanced for its construction and secured by mortgage. The captain appointed to command it insures it for the amount of three seasons' salary under a written engagement. In the month of March the steamer is totally destroyed by fire.

Can all the policies be enforced? Give reasons.

3. When may the insured make an abandonment to the insurer, and what is its effect?

4. A company refuses to pay a claim under an accident policy on the ground that the death was not accidental. When sued, it pleads non-fulfilment of a condition of the policy requiring immediate written notice of the accident.

Can the plea be maintained?

5. Who are common carriers, and what is their liability for loss or damage of things entrusted to them?

6. Define "Charter-party" and "Bill of Lading?"

7. A ship has just been built.

State the procedure preliminary to her registration.

8. Under the Railway Act what should the arbitrators take into consideration in determining the compensation due to an expropriated proprietor?

9. What business is a bank specially prohibited from carrying on, and are there any exceptions?

10. What are the provisions of the Bank Act as to dividends?

SECOND AND THIRD YEARS.

CRIMINAL LAW.

THURSDAY, APRIL 2ND, 1903:—MORNING, 9 TO 12.

Examiner, ... THE HON. MR. JUSTICE DAVIDSON.

1. What three elements are essential to the existence of an extradition crime? What principle is asserted in the Extradition Act, and generally found in the Treaties with regard to political offences?

2. Within what time after his committal for surrender must a fugitive be surrendered and conveyed out of Canada? If the prescribed time is permitted to lapse, what are his rights and how would you assert them?

3. In respect of questions which may tend to criminate a witness or to establish his liability to a civil proceeding,

(*a*) May he, if compelled to answer, protect himself?

(*b*) Where do you find the law, and is it applicable to evidence given under any provincial enactment?

4. What are the rights as to giving evidence,
(*a*) Of the accused person;
(*b*) Of the husband or wife of the accused person.

5. State the classes into which crimes are divided with respect to the numbers of peremptory challenges, and how many are allowed in each of such classes?

6. When can a husband or wife steal fro meach other?

7. Explain "doli incapax," "doli incapax sed malitia supplet"; "doli capax."

8. What must be the nature of a threat or inducement, to exclude evidence of the resulting confession? Is a confession admissible which has been obtained by an artifice, as for example by the false statement that an accomplice has confessed?

9. Draw a plea of justification to an indictment for libel. By what imperial act was it first made possible to plead the truth of a libel?

10. State the several methods whereby a bill of indictment may be laid before a grand jury. In what respect did the Code change the pre-existing law?

11. Explain the purpose and extent of the Crown's right to order a juror to "stand by."

12. Define:—"Perjury"; "Bigamy"; "Dwelling house."

13. Give as nearly as you can the proclamation for the dispersion of rioters. By whom and how ought it to be read? What is the punishment for disobeying its commands?

14. What is homicide? When is it culpable? Within what time from the cause of death must death take place?

16. Give the Code definition of an assault.

16. When is drunkenness an excuse for crime and when not?

17. Can there be an accessory before the fact to manslaughter? State reasons and any possible exception to the rule you assert.

18. Where do you find the law in this Province governing the writ of *Habeas Corpus*:—

(*a*) In relation to criminal or supposed criminal matters?

(*b*) In relation to persons restrained of their liberty otherwise than for criminal or supposed criminal matters?

SECOND AND THIRD YEARS.

SUCCESSIONS, GIFTS AND SUBSTITUTIONS.

TUESDAY, APRIL 14TH, 1903:—MORNING, 9 TO 12.

Examiner, ... THE HON. MR. JUSTICE DOGHERTY.

First eight questions only to be answered by Second Year Students.

All twelve questions to be answered by Graduating Class.

1. What is the distinction between the legitimate and the irregular succession?

In what respects if any do the positions of the lawful and the irregular heir differ:

(*a*) As regards the seizin;

(*b*) As regards liability for debts of the succession?

2. What limitations does our law impose upon freedom of disposal of property by will? What is the source of our law in this regard? Mention the principal difference between it, and the French customary law.

3. In determining the order in which relatives of a person deceased are called to his succession, is proximity in degree of relationship to him, alone to be considered? If not, what other matters require to be taken into consideration?

4. Upon what grounds may an heir who has accepted, attack his acceptance?

Upon what grounds may one who has renounced attack his renunciation?

In what case may the creditors of such heir have his acceptance or renunciation set aside, and what are their rights upon such acceptance or renunciation being set aside?

5. What formalities are essential to the validity of the holograph will?

6. To what extent is the particular legatee liable for the debts of the testator:

(*a*) Personally?

(*b*) Hypothecarily?

If he be so liable, has he any recourse for such debts paid by him, and if so what recourse and against whom?

7. What is the extent of the liability for debts of the succession:

(*a*) Of the universal legatee;

(*b*) Of the legatee by general title;

(*c*) Of the ascendant donor who takes, in an abintestate succession, an object by him given to the deceased?

8. Who may demand a partition? Against whom must it be demanded? When may it be demanded? What is its effect as regards ownership of the property partitioned?

9. What are the special requirements of law as regards the form of execution of gifts *inter vivos?* What is the effect on non-compliance with such requirements?

10. What conditions, if any, permissible in onerous contracts, are prohibited in gifts *inter vivos?*

What is the effect of a gift made subject to such conditions?

11. A substituted immoveable property is seized upon and for a debt of the institute. The curator to the substitution opposes the seizure.

Is his opposition well founded? Reason for your answer.

12. A. bequeathes a property to B. in usufruct, providing that at B.'s death said usufruct shall pass to C., that at C.'s death said usufruct shall pass to D., and at D.'s death the property shall pass to D.'s children.

What is the effect of the disposition? What is the nature of the right of each of the legatees?

How would B.'s right be affected should C. and D. die before B., and D. leave no children?

Should C. and D. both die before B., and D. leave children, what would be the right of such children?

What would be the right of such children of D., should all the legatees take in turn the benefit of the bequest? Reasons for your answers.

CIVIL PROCEDURE AND EVIDENCE.

THIRD YEAR.

TUESDAY, APRIL 7TH, 1903:—MORNING, 9 TO 12.

Examiner,. . . . . PERCY C. RYAN, B.C.L.

1. Explain the nature of judicial sequestration. In what cases does it lie and how can it be obtained? Have courts any power to decree sequestration in cases other than those specified by law?

2. What is conservatory attachment? Describe the scope of this remedy, illustrating by typical cases. Draft the initial proceeding in any case to which it applies.

3. A., a trader, submitted a statement of his assets

and liabilities to his creditors in April, and showed an apparent surplus of $15,000. In October of the same year A. made a judicial abandonment of his property, showing a deficit of $20,000, and professed inability to account for the shrinkage. What remedy is open to a creditor, and how would the conduct of A. be qualified in law? Draft the appropriate proceeding.

4. State the rules governing the grant or refusal of mandamus.

5. Classify judicial admissions, and state when they can be divided.

6. What is a Petition of Right? In what cases is it denied?

7. A. sells B. all the stock in trade and good will of a grocery, and binds himself not to re-enter the same business in the same city. Is such a covenant legal? Explain what recourse B. has in the event of a breach by A. of such covenant. Draft the first proceeding.

8. What are the use and object of discovery and inspection of documents? When can they be resisted and for what reasons?

9. State when appeals lie from interlocutory judgments, and how they are instituted.

10. Before what jurisdiction can suits for the infringement of letters patent of invention be taken? Draft an action of this kind. Enumerate the defences to such actions. When should *scire facias* be taken?

THIRD YEAR.

COMMERCIAL LAW.—(*Second Paper.*)

(*For Third Year only.*)

SALE—BILLS AND NOTES.

SATURDAY, APRIL 11TH, 1903:—MORNING, 9 TO 12.

Examiner,. . . . . PROF. SMITH.

1. Who will bear the loss in the following cases:—

(*a*) A. sells B. a horse having a disease of which it subsequently dies?

(*b*) *Quid* if at the time of its death it were too late for B. to take a redhibitory action?

(*c*) If the horse have the disease at the time of the sale, but be killed by a railway train without fault on the part of B. or the railway company?

(*d*) If B. be in fault in allowing the horse to stray on the railway line?

(*e*) If A. have only promised to sell the horse to B. but have given delivery of it?

2. At the time of eviction the thing sold has deteriorated through the buyer's own neglect.

What has he a right to claim from the seller?

3. When a litigious right is sold, how may the debtor obtain his discharge from the buyer of the right? Are there any exceptions?

4. What are the rights of the holder:—

(*a*) When the drawer of a bill is a fictitious person;

(*b*) When the payee is a fictitious person?

5. What is meant by an "accommodation party" to a bill, and what is his liability upon it? Will it be different if the holder, when he took the bill, knew him to be an accommodation party?

6. When is notice of dishonour dispensed with?

THIRD YEAR.

CONSTITUTIONAL LAW AND OBLIGATIONS.

DECEMBER, 1903.

1. Describe the conditions which led up to the Quebec Act.

2. What is "responsible government?" When was it introduced into Canada and why?

3. What is "direct taxation?" Who can impose it? Illustrate your answer by cases.

4. In an act it was provided that in every policy of insurance it should be an implied term that the company should not be liable if there was a prior insurance not disclosed and assented to. Could this be done by the Parliament of Canada or by the Province? Explain.

5. What is meant by saying that the *cabinet* is unknown to the law?

Answers in separate book.

1. Enumerate and explain fully the different incapacities to contract, giving all the rules concerning them.

2. What is lesion? Give the principal rules of law on that subject.

3. What is the "actio pauliana"? Give the conditions for its existence and its effects.

4. In what cases is a person responsible in damages towards another, independently of any pre-existing obligation? Explain fully.

5. What is subrogation? When and under what conditions does it take place? What are its effects?

THIRD YEAR.

HISTORY, AGENCY AND PARTNERSHIP, AND CORPORATIONS.

SATURDAY, APRIL 18TH, 1903:—MORNING, 9 TO 12.

1. What other system of law besides customary entered into the formation of the Civil Law of France, and how were the two combined?

2. Under what auspices were the first civil and criminal courts organized after the full establishment of the British regime?

3. Mention certain ordinances between 1774 and 1791 in relation to law and judicial proceedings?

4. What are the leading features of the declaration of 1743 registered by the Council of Quebec, regarding Mortmain?

5. What are the formalities for the issue of preference stock and what species of preference can be given to its holders?

6. Is it legal to issue shares of a Company at a discount either during the ordinary operation of the Company or when it is in difficulties, and cannot sell the stock at par?

7. What are the different remedies given to a Company to enforce payment of calls from shareholders?

8. How does the contract of Mandate differ from the contract of Lease and Hire of services?

9. What are the powers of a commercial agent with regard to documents of title entrusted to him by the owner?

10. In case of a dissolution of a partnership, what is the rule as to the payment of the debts of the firm and of the debts of the individual partners?

THIRD YEAR.

INTERNATIONAL LAW—(*Public and Private*).

THURSDAY, APRIL 16TH, 1903:—MORNING, 9 TO 12.

Examiner,.. .. .. PROF. LAFLEUR.

1. How was the "Monroe Doctrine" originally formulated in 1823, and what interpretation was given to it by the United States to justify its intervention in the delimitation of the boundary between Great Britain and Venezuela in 1895, and its abstention from intervening in the recent blockade of Venezuelan ports by Great Britain and Germany?

2. Upon what principles was the violation of territory excused in the case of the seizure of the "Caroline" in American waters by the Canadian forces in 1837?

3. What are the effects of carrying contraband:

(*a*) On the vessel;

(*b*) On the innocent cargo?

4. During the Crimean war a French cruiser captured a Hanoverian ship on a voyage from Lisbon to Hamburg with a cargo, a portion of which was saltpetre. The French prize court found upon the evidence that the real destination of the saltpetre was Russia, and that it was uncertain whether the saltpetre was to be forwarded overland to Russia from Hamburg, or whether the ship, after discharging the rest of her cargo at Hamburg, would carry the saltpetre to a Russian port in the Baltic. Was the saltpetre seizable as contraband upon either theory?

5. Can a blockade be maintained against neutrals

while relaxed against the belligerent? Can an effective blockade be maintained by a cruising squadron?

6. What are the sources of the rules of Private International Law in the Province of Quebec?

7. What is the effect of a consent of the parties that the foreign law should be ascertained by the Court by a reference to foreign statutes and authorities?

8. What law will our Courts apply for the determination of:

(*a*) The formal validity of a marriage;

(*b*) The capacity of the parties to marry;

(*c*) The effect of the marriage on the property of the consorts in the absence of marriage covenants;

(*d*) The capacity of the wife to make contracts?

9. An illegitimate domiciled in England dies intestate leaving moveable property in this province. Do these moveables escheat as *bona vacantia* to the English Crown, or to the Province of Quebec?

10. A. and B. are both domiciled in the Province of Quebec. While A. is passing through Vermont, B. causes him to be arrested for debt and A. obtains his release by paying the claim under protest. By the laws of that state a foreigner may be arrested for an ordinary debt. A. sues B. in this province for damages for false arrest. Argue the case for the defendant.

THIRD YEAR.

MARRIAGE COVENANTS, PRESCRIPTION, LEASE AND HIRE, MINOR CONTRACTS, MUNICIPAL LAWS.

THURSDAY, MARCH 26TH, 903:—MORNING, 9 TO 12.

1. An immoveable is given to a husband by his father, on condition of certain payments to his brothers and sisters and subject to the payment of all the debts of the donor, the whole amounting to more than the value of the immoveable. These sums are paid by the community.

Will the immoveable fall into the community or be a propre of the husband? Give full reasons.

2. The husband makes an endowment:
(*a*) To a child of his preceding marriage;
(*b*) To the child of a friend;
(*c*) To a child of his present marriage:
Which of these gifts will fall upon him personally or upon the community and why?

3. At the dissolution of the community, the consorts are both indebted to it, in the sum of $5,000. The other assets of the community amount to $5,000, but it owes the wife $15,000.
Are the consorts bound to return to the community the amount of their indebtedness, or can they, being both in same position, retain the same?
Explain the result in either case.

4. What exceptions are perpetual?
What prescription applies to interests or rents received by an agent *quoad* his principal?
Quid of fruits and revenues received by a possessor in bad faith?
By an heir who is excluded from the succession by reason of unworthiness?

5. What are the special elements required in the ten years prescription by subsequent purchasers?
Quid if the purchaser becomes in bad faith after the acquisition?
Quid after this prescription has been renounced or interrupted?

6. What is the prescription of the action against architects and contractors, based upon the warranty of the work they have done or supervised?
Explain the different systems upon the question.

7. What is the right of the creditor of a life rent when an immoveable subject to it is judicially sold?

8. In what case can the surety proceed against the debtor before paying the debt?

9. To secure the payment of a debt maturing on the 1st of May, 1902, a thing has been given in pledge on the 1st of December, 1901. On the 1st of January, 1902, a new debt is contracted in favour of the same debtor, which becomes due on the 1st of April, 1902. The first debt has been paid, but the second is still

due; is the debtor entitled to the return of the pledge? Give reasons in support of answer.

10. What is the jurisdiction of the board of delegates?

How is the board called upon to exercise their duties? Who acts as president? As secretary-treasurer?

THIRD YEAR.

REAL PROPERTY LAW.

MONDAY, APRIL 20TH, 1903:—MORNING, 9 TO 12.

Examiner, ... PROF. MARLER.

1. Under what tenures is land in this Province held? Wherein do they differ?

2. What changes has the Code introduced as to alienation by Contract? What part does registration play?

3. What formalities, as to third persons, must be accomplished in the case of transmission of land by death? In the absence of these formalities, what effect has a real right granted by the owner?

4. How is land forming part of an official number described? What is the effect of the registration of a deed of land, when the official number is omitted and the official plan is in force? Can the defect be remedied and how? From what time does the registration avail?

5. How can a wife sell her own land when her husband refuses his authorization: (*a*) When she is separate as to property; (*b*) When she is common as to property?

6. What claims give a purchaser the right to withhold the price? To what extent can he withhold?

7. What security has the unpaid Vendor for security of the price due him? How does he preserve this right? Can he dissolve the sale?

8. What rights are not purged by a sheriff's sale?

9. Of what is the prosecuting creditor the warrantor in case of a sheriff's sale?

10. What are the causes of preference among creditors?

11. What are the rights of the Emphyteutic lessor for the recovery of the rent due him? Can he exercise the remedies of an ordinary lessor?

12. What are fruits? How classified? Give examples of each. What difference is there as to the mode of their perception?

13. A. grants a hypothec to B. and sells the hypothecated land to C. Neither A. nor C. pays the obligation secured by hypothec. What are B's remedies?

14. State briefly what defences C. may have to the action?

15. How do hypothecs rank since the Code? What change did the Code introduce?

FINAL EXAMINATION.

ROMAN LAW.

DECEMBER, 1903.

1. Explain agnation and indicate how it disappeared.

2. From what books was Justinian's Digest compiled? State, generally, the method of its compilation.

3. Give as many illustrations as you can of the way in which the praetors modified the *jus civile.*

4. Why should a possessor in bad faith acquire by prescription, and a *detentor* never so acquire?

5. Explain *jus ad rem, jus in re.*

6. What were the main characteristics of *emphyteusis?*

7. Give a sketch of the history of the *testamentum tripertitum.*

8. A, who dies after Justinian, leaves no descendants. He leaves mother, paternal grandfather, a sister of the full-blood, a half-brother and two nephews, the sons of a half-sister deceased. How is his succession divided?

9. What was meant in the Roman Law by the *causa civilis* of an obligation?

10. In an alternative obligation explain the effects of the loss of one or both of the objects before performance.

MATRICULATION AND A. A.

EXAMINATION PAPERS

JUNE, 1903.

PRELIMINARY SUBJECTS

ENGLISH COMPOSITION.

MONDAY, JUNE 8TH:—MORNING, 11 TO 12.

Write an essay of not less than one page on any *one* of the following subjects:

My Animal Friends.

Courage.

The Story of Jacques Cartier.

ENGLISH DICTATION.

MONDAY, JUNE 8TH:—MORNING, 10.30 TO 11.

They enjoy a superabundance of the necessaries and conveniences of life, with the security of person and property, the two great concerns of mankind. The hides of deer, bears, tigers and wolves, together with honey, wax, and other productions of the country, they exchange with the white people for clothing and tools. They seem to be free from want or desires. They have no cruel enemy to dread; nothing to give them disquietude, but the gradual encroachments of the white people. Thus contented and undisturbed, they appear as blithe and free as the birds of the air, and like them volatile and active, tuneful and vociferous. The visage, action and deportment of these Indians form the most striking picture of happiness in this life; joy, contentment, love, and friendship without guile or affectation, seem inherent in them. They are fond of games and gambling, and amuse themselves like children, in relating extravagant stories to cause surprise and mirth.

Note for the Presiding Examiner.—The Deputy Examiner will read the extract *three* times, the candidates writing it out during the *second* reading. The first and

third readings are respectively intended to give the candidates a general idea of the character of the passage, and to guide them in punctuating. *As it is of great importance that candidates should not be left in a state of uncertainty, the Deputy Examiner will repeat, on request, any word or phrase. The Deputy Examiner will also inform the candidates that obvious attempts to make letters do double duty (e.g. to make a letter serve for e or i) will be regarded as mistakes. Full stops and semicolons are to be indicated by the Deputy Examiner.*

ENGLISH GRAMMAR.

MONDAY, JUNE 8TH:—MORNING, 9 TO 10.30.

(N.B.—*Not more than two questions in each section are to be answered. B 6 and C 8 are compulsory.*)

A.

1. Give the masculine of *bride, widow, nun, filly, ewe, vixen;* and the possessive plural of *goose, Norman, mistress,* and *lady superintendent.*

2. Distinguish clearly between the verbs *lie* and *lay,* and give the past tense and past participle of each, with examples of their correct use.

3. What is the difference between the Gerund and the Present Participle? Give two examples of each.

B.

4. Turn the following sentences into the passive form:—

(*a*) John was beating the dog with a stick.

(*b*) The students presented addresses to the retiring professors.

(*c*) Give him a crust and send him away.

(*d*) She had taught him music.

(*e*) The man looked at the book and threw it down.

5. Define Auxiliary, Impersonal, Strong and Weak verbs, and give three examples of each.

6. Parse the words in italics in the following sentence:—

On the *view* of *this subject* a *thousand* uses *suggest themselves to* a *contriving mind.*

C.

7. Correct the following sentences where you think it necessary, giving reasons:—

(*a*) Will we go together?

(*b*) Have either of you three a paper?

(*c*) Between you and I, all he said was "she looked prettily."

(*d*) Being late for the examination, it was no use for me trying to pass.

(*e*) Wanted a boy to run errands with a good character.

8. Analyse the following:—

I hear it is sometimes given out in France that what is doing among you is after the example of England.

BRITISH HISTORY.

WEDNESDAY, JUNE 10TH:—MORNING, 10.30 TO 12.

(*In answering the first three questions, any four parts of each may be selected. On the contrary, the whole of the fourth question must be answered.*)

1. (*a*) What was the policy of Henry VII. towards the nobles?

(*b*) How were the following persons connected with the beginning of the Reformation in England: Catharine of Aragon; Cardinal Wolsey; Sir Thomas More?

(*c*) Write what you know about Edward Seymour, Duke of Somerset, and explain why he was called "Protector."

(*d*) Give some account of religious persecution in the reigns of Mary I. and Elizabeth.

(*e*) What were the main achievements of Sir Francis Drake?

(*f*) How did trouble arise in the reign of Elizabeth over the question of monopolies?

2. (*a*) Why is the Hampton Court Conference memorable?

(*b*) Sketch the relations of Charles I with Scotland prior to the outbreak of the Civil War.

(*c*) How did Oliver Cromwell come to be the chief person in England?

(*d*) What was the Cabal Ministry?

(*e*) Under what circumstances did the Trial of the Seven Bishops take place? What was the result?

(*f*) Name the chief battles in which England took part during the War of the Spanish Succession.

3. (*a*) Give some account of the Jacobite risings.

(*b*) Sketch the political career of Sir Robert Walpole after he became Prime Minister.

(*c*) How were the following persons connected with the American Revolution: George Grenville; Edmund Burke; Lord North?

(*d*) Name three battles fought in the wars between England and Napoleon.

(*e*) Describe the passing of the First Reform Bill.

(*f*) Mention the chief stages in the Home Rule movement.

4. (*a*) What were the chief terms of the Petition of Rights?

(*b*) Give the dates of the Peace of Utrecht, the accession of George III., and the Indian Mutiny.

(*c*) What are the chief claims to remembrance of the elder Pitt? What title did he choose when raised to the Peerage?

(*d*) Sketch the political career of Mr. Gladstone or Lord Beaconsfield.

ARITHMETIC.

WEDNESDAY, JUNE 10TH:—MORNING, 9 TO 10.30.

(*Answer two questions out of each section.*)

SECTION I.

1. How many bricks 9 inches long, 4½ inches wide, and 4 inches thick, will be required to construct a wall 60 ft. long, 17 ft. high, and 4 ft. thick?

2. Extract the square root of (1) 17161; (2) $\frac{625}{22207}$.

(3) .000000133225.

3. Of two icicles hanging from the edge of a roof, one is 1.02 inches longer than the other. The shorter one increases in length at the rate of 3.014 inches in a minute. Find the rate of increase of the other in order that they may be the same length in 2 hours 5 minutes.

SECTION II.

4. Find the difference between the simple and compound interest of $350 for 3 years at 8 per cent.

5. A. can do a piece of work in 6 days of 10 hours each, and B. can do it in 8 days of 9 hours each. For how many hours a day must A. and B. be engaged together to do the work in 4 days?

6. A. invests $552 in 3¼ per cent. stock at 92 ; find his income.

SECTION III.

7. Find the number of meters in one mile.

8. Find in kilos, the weight of a rectangular block of gold 20 cm. in length, 5 cm. in thickness and 7 cm. in breadth, the weight of a mass of gold being 19 times the weight of an equal bulk of water.

9. A cubic foot of water weighs 1,000 oz. Find in tons the weight of a rainfall of one inch over an acre of ground.

LATIN BOOKS AND SIGHT TRANSLATION.

THURSDAY, JUNE 11TH:—AFTERNOON, 2.30 TO 4.30.

A.

(*a*) Translate and explain the construction of the words written in italics:—

(1).—NEPOS, MILTIADES VII.

Cum iam in eo esset, ut *oppido* potiretur, procul in continenti lucus, qui ex insula conspiciebatur, nescio quo casu *nocturno tempore* incensus est. Cuius flamma ut ab oppidanis et oppugnatoribus est visa, *utrisque* venit in opinionem signum a classiariis regiis datum. Quo factum est ut et Parii a deditione deterrerentur et Miltiades, timens ne classis regia adventaret, *incensis operibas*, quae statuerat, cum totidem navibus atque erat profectus Athenas magna cum offensione civium suorum rediret.

(*b*) Parse fully: eo, Quo, Athenas, rediret.

(2).—CAESAR, DE BELLO GALLICO II., 30.

Bello Helvetiorum confecto totius fere Galliae legati, *principes* civitatum, ad Caesarem *gratulatum* convenerunt: Intelligere sese, tametsi pro veteribus Helvetiorum injuriis populi Romani ab his poenas bello repetisset, tamen eam rem non minus ex usu terrae Galliae quam populi Romani accidisse, propterea quod eo consilio florentissimis rebus domos suas Helvetii *reliquissent*, uti toti Galliae bellum *inferrent*.

(3).—OVID. METAMORPHOSES.

Translate with scansion of the first three lines.

At tu, funesti ne sim tibi muneris auctor,
nate, Cave, dum resque sinit, tua corrige vota.
Scilicet ut nostro genitum te *sanguine* credas,
pignora certa petis? do pignora certa timendo,
et patrio pater esse metu probor. Adspice vultus
ecce meos: utinamque oculus in pectora posses
inserere, et patrias intus deprendere curas!

B.—SIGHT.

His de rebus Caesar certior factus et infirmitatem Gallorum veritus, quod sunt in consiliis capiendis mobiles et novis plerumque rebus student, nihil his committendum existimavit. Est autem hoc Gallicae consuetudinis, uti et viatores etiam invitos consistere cogant et quod quisque corum de quaque re audierit aut cognoverit quaerant, et mercatores in oppidis vulgus circumsistat, quibusque ex regionibus veniant quasque ibi res cognoverint pronuntiare cogant. His rebus atque auditionibus permoti de summis saepe rebus consilia ineunt, quorum eos poenitere necesse est, quum incertis rumoribus serviant et plerique ad voluntatem corum ficta respondeant.

ALTERNATIVE PAPER ON LATIN BOOKS FOR ONTARIO CANDIDATES.

THURSDAY, JUNE 11TH:—AFTERNOON, 2.30 TO 4.

1. Translate with explanatory notes on words printed in Italics:

(*a*) Tamen non effugit civium suorum invidiam. Namque ob eundem timorem, quo damnatus erat Miltiades, *testularum* suffragiis e civitate eiectus *Argos habitatum* concessit. Hic cum propter multas virtutes viveret, Lacedaemonii legatos Athenas miserunt, qui eum absentem *accusarent*, quod societatem cum rege Perse ad Graeciam opprimendam *fecisset*. Hoc crimine absens damnatus est.

(*b*) Eodem die legati ab hostibus missi ad Caesarem de pace venerunt. His Caesar numerum obsidum, *quem* antea imperaverat, duplicavit eosque in continentem adduci iussit, quod propinqua die aequinoctii infirmis navibus hiemi navigationem *subiciendam* non existimabat. Ipse idoneam tempestatem nactus paulo post mediam noctem naves solvit; quae omnes incolumes ad continentem pervenerunt; sed ex iis onerariae duae eosdem, quos reliqui, portus capere non potuerunt et paulo infra delatae sunt.

(*c*) Ex his omnibus longe sunt humanissimi, qui Cantium incolunt, quae regio est maritima omnis, neque multum a Gallica differunt consuetudine. Interiores plerique frumenta non serunt, sed lacte et *carne* vivunt *pellibusque* sunt vestiti. Omnes vero se Britanni vitro inficiunt, quod caeruleum efficit colorem, atque *hoc* horridiore sunt in pugna *aspectu;* capilloque sunt promisso atque omni parte corpore rasa praeter caput et labrum superius.

Give the principal parts of *serunt, vivunt, rasa.*

(*d*) Vestibulum ante ipsum primoque in limine Pyrrhus
Exsultat, telis et luce coruscus ahena;
Qualis, ubi in lucem coluber, mala gramina pastus,
Frigida sub terra tumidum quem bruma tegebat,
Nunc positis novus exuviis nitidusque iuventa,
Lubrica convolvit, sublato pectore, terga
Arduus ad solem, et linguis micat ore trisulcis.
Una ingens Periphas et equorum agitator Achillis
Armiger Automedon, una omnis Scyria pubes
Succedunt tecto, et flammas ad culmina iactant.
Ipse inter primos correpta dura bipenni
Limina perrumpit postesque a cardine vellit
Aeratos.

Scan the first two lines of (*d*).

2. Give in substance Nepos' Life of Aristides.

3. Translate:—

Quos quo facilius repellerent, si forte bellum renovare conarentur, ad classes aedificandas exercitusque comparandos quantum pecuniae quaeque civitas daret, Aristides delectus est qui constitueret, eiusque arbitrio quadringena et sexagena talenta quotannis Delum sunt collata; id enim commune aerarium esse voluerunt.

LATIN GRAMMAR AND COMPOSITION.

THURSDAY, JUNE 11TH:—MORNING, 9 TO 11.

A.—GRAMMAR.

1. Decline in the sing. only, marking by the usual sign, all long vowels; filius, caput, princeps, genus, flos, vis.

2. Give the genitive (sing. and pl.) of turris, senex, caro cornu, mare.

3. Give the acc. (sing. and pl. all genders) of: vetus facilis, acer, alius, unus; dat. (sing. and pl. all genders) of: is, iste, ille.

4. Give the other degrees of comparison for dives, vetus, plus, pessimus, magnus, imus.

5. Give the Latin for: 11, 11th; 19, 19th; 25, 25th; two thousand soldiers; in the year 1896.

6. Give the principal parts of prosum, facio (passive voice), eo, aufero, effero, malo, vereor, loquor.

B.—COMPOSITION.

Translate into Latin:—

When messages had come to Caesar by the Senones and other Gauls, who were neighbours of the Belgae, he charged them to find out what the Belgae were doing. So they found out and informed him that the Belgae were collecting forces, that they might march against his army. Then Caesar sent the two legions lately levied in hither Gaul, early in the summer, under the command of Pedius, and as soon as there was forage, went himself; for now he did not hesitate to march against them immediately.

GREEK AUTHORS AND SIGHT TRANSLATION.

MONDAY, JUNE 15TH:—AFTERNOON 2 TO 4.

XENOPHON, ANABASIS I.

A.

1. Translate with notes on the construction of words underlined:—

(*a*) Ἐν Μιλήτῳ δ' ὁ Τισσαφέρνης, προαισθόμενος τὰ αὐτὰ ταῦτα βουλευομένους, ἀποστῆναι πρὸς Κῦρον, τοὺς μὲν ἀπέκτεινε, τοὺς δ' ἐξέβαλεν. Ὁ δὲ Κῦρος, ὑπολαβὼν τοὺς φεύγοντας, συλλέξας στράτευμα, ἐπολιόρκει Μίλητον καὶ κατὰ γῆν καὶ κατὰ θάλατταν, καὶ ἐπειρᾶτο κατάγειν τοὺς ἐκπεπτωκότας.

(*b*) Ἀλλὰ ἐπεὶ ὑμεῖς ἐμοὶ οὐκ ἐθέλετε πείθεσθαι, οὐδὲ ἕπεσθαι, ἐγὼ σὺν ὑμῖν ἕψομαι, καὶ, ὅ τι ἂν δέῃ, πείσομαι.

Νομίζω γὰρ. ὑμᾶς ἐμοὶ εἶναι καὶ πατρίδα καὶ φίλους καὶ συμμάχους, καὶ σὺν ὑμῖν μὲν ἂν εἶναι τίμιος, ὅπου ἂν ὦ· ὑμῶν δ' ἐρημωθεὶς, οὐκ ἂν ἱκανὸς εἶναι οἶμαι, οὔτ' ἂν φίλον ὠφελῆσαι, οὔτ' ἂν ἐχθρὸν ἀλέξασθαι.

(c) Διφθέρας, ἃς εἶχον στεγάσματα, ἐπίμπλασαν χόρτου κούφου, εἶτα συνῆγον καὶ συνέσπων, ὡς μὴ ἅπτεσθαι τῆς κάρφης τὸ ὕδωρ· ἐπὶ τούτων διέβαινον· καὶ ἐλάμβανον τὰ ἐπιτήδεια, οἶνόν τε ἐκ τῆς βαλάνου πεποιημένον τῆς ἀπὸ τοῦ φοίνικος, καὶ σῖτον μελίνης· τοῦτο γὰρ ἦν ἐν τῇ χώρᾳ πλεῖστον.

(d) Ἐνταῦθα Γαυλίτης παρὼν, φυγὰς Σάμιος, πιστὸς δε Κύρῳ, εἶπε· "Καὶ μὴν, ὦ Κῦρε. λέγουσί τινες, ὅτι πολλὰ ὑπισχνῇ νῦν, διὰ τὸ ἐν τοιούτῳ εἶναι τοῦ κινδύνου προσιόντος· ἂν δ' εὖ γένηταί τι. οὐ μεμνῆσθαι σε· ἔνιοι δὲ, οὐδ' εἰ μεμνῷό τε καὶ βούλοιο, δύνασθαι ἂν ἀποδοῦναι, ὅσα ὑπισχνῇ."

(e) Ἡ δὲ γνώμη ἦν, ὡς εἰς τὰς τάξεις τῶν Ἑλλήνων ἐλῶντα καὶ διακόψοντα. Ὁ μέντοι Κῦρος εἶπεν, ὅτε καλέσας παρεκελευετο τοῖς Ἕλλησι, τὴν κραυγὴν τῶν βαρβάρων ἀνέχεσθαι, ἐψεύσθη τοῦτο· οὐ γὰρ κραυγῇ, ἀλλὰ σιγῇ, ὡς ἀνυστὸν, καὶ ἡσυχῇ ἐν ἴσῳ καὶ βραδέως προσῄεσαν.

II. Write the principal parts of: ἀποστῆναι (a), πείσομαι (b), ὑπισχνῇ (d), ἐλῶντα (e). Parse μεμνῷό (d).

or

Xenophon, Anabasis II.

A.

1. Translate with notes explaining the construction of words underlined:—

(a) Πρὸς ταῦτα Φαλύνος εἶπε, "Βασιλεὺς νικᾷ ἡγεῖται, ἐπεὶ Κῦρον ἀπέκτονε. Τίς γὰρ αὐτῷ ἐστιν, ὅστις ἀρχῆς ἀντιποιεῖται; Νομίζει δὲ καὶ ὑμᾶς ἑαυτοῦ εἶναι, ἔχων ἐν μέσῃ τῇ ἑαυτοῦ χώρᾳ, καὶ ποταμῶν ἐντὸς ἀδιαβάτων.

(*b*) Ἐντεῦθεν δὴ, ἐπεὶ σκότος ἐγένετο, Μιλτοκύθης μὲν ὁ Θρᾷξ, ἔχων τούς τε ἱππέας τοὺς μεθ' ἑαυτοῦ εἰς τεσσαράκοντα, καὶ τῶν πεζῶν Θρακῶν ὡς τριακοσίους, ηὐτομόλησε πρὸς βασιλέα. Κλέαρχος δὲ τοῖς ἄλλοις ἡγεῖτο κατὰ τὰ παρηγγελμένα, οἱ δ' εἵποντο·

(*c*) Ἀπὸ δὲ τοῦ Τίγρητος ἐπορεύθησαν σταθμοὺς τέτταρας, παρασάγγας εἴκοσιν, ἐπὶ τὸν Φύσκον ποταμὸν, τὸ εὖρος πλέθρου· ἐπῆν δὲ γέφυρα. Καὶ ἐνταῦθα ᾠκεῖτο πόλις μεγάλη, ᾗ ὄνομα Ὦπις· πρὸς ἣν ἀπήντησε τοῖς Ἕλλησιν ὁ Κύρου καὶ Ἀρταξέρξου νόθος ἀδελφὸς, ἀπὸ Σούσων καὶ Ἐκβατάνων στρατιὰν πολλὴν ἄγων, ὡς βοηθήσων βασιλεῖ·

(*d*) Σὺν μὲν γάρ σοι πᾶσα μὲν ἡμῖν ὁδὸς εὔπορος, πᾶς δὲ ποταμὸς διαβατὸς, τῶν δ' ἐπιτηδείων οὐκ ἀπορία· ἄνευ δέ σου πᾶσα μὲν ἡ ὁδὸς διὰ σκότους, (οὐδὲν γὰρ αὐτῆς ἐπιστάμεθα,) πᾶς δὲ ποταμὸς δύσπορος, πᾶς δ' ὄχλος φοβερός φοβερώτατον δ' ἐρημία· μεστὴ γὰρ πολλῆς ἀπορίας ἐστίν.

(*e*) Μένων δὲ ὁ Θετταλὸς δῆλος ἦν ἐπιθυμῶν μὲν πλουτεῖν ἰσχυρῶς, ἐπιθυμῶν δὲ ἄρχειν, ὅπως πλείω λαμβάνοι· ἐπιθυμῶν δὲ τιμᾶσθαι, ἵνα πλείω κερδαίνοι· φίλος τ' ἐβούλετο εἶναι τοῖς μέγιστα δυναμένοις, ἵνα ἀδικῶν μὴ διδοίη δίκην. Ἐπὶ δὲ τὸ κατεργάζεσθαι, ὧν ἐπιθυμοίη, συντομωτάτην ὁδὸν ᾤετο εἶναι διὰ τοῦ ἐπιορκεῖν τε καὶ ψεύδεσθαι καὶ ἐξαπατᾶν·

II. Write the principal parts of : εἵποντο (*b*), ᾤετο (*e*). Parse τὸ εὖρος (*c*), ἀδικῶν, τοῦ ἐπιορκεῖν (*e*).

B.

Translation at Sight.

Translate into English :—

Τούτων λεχθέντων ἀνέστησαν καὶ ἀπελθόντες κατέκαον τὰς ἁμάξας καὶ τὰς σκηνάς, τῶν δὲ περιττῶν ὅτου μὲν δέοιτό τις μετεδίδοσαν ἀλλήλοις, τὰ δὲ ἄλλα εἰς τὸ πῦρ ἐρρίπτουν. ταῦτα ποιήσαντες ἠριστοποιοῦντο. ἀριστοποιουμένων δὲ αὐτῶν ἔρχεται Μιθραδάτης σὺν ἱππεῦσιν ὡς τριάκοντα, καὶ καλεσάμενος τοὺς στρατηγοὺς εἰς ἐπήκοον λέγει ὧδε. Ἐγώ, ὦ ἄνδρες Ἕλληνες, καὶ Κύρῳ πιστὸς

ἦν, ὡς ὑμεῖς ἐπίστασθε καὶ νῦν ὑμῖν εὔνους· καὶ ἐνθάδε δ' εἰμὶ σὺν πολλῷ φόβῳ διάγων. εἰ οὖν ὁρῴην ὑμᾶς σωτήριόν τι βουλευομένους, ἔλθοιμι ἂν πρὸς ὑμᾶς καὶ τοὺς θεράποντας πάντας ἔχων. λέξατε οὖν πρός με τί ἐν νῷ ἔχετε ὡς φίλον τε καὶ εὔνουν καὶ βουλόμενον κοινῇ σὺν ὑμῖν τὸν στόλον ποιεῖσθαι.

GREEK GRAMMAR AND COMPOSITION.

MONDAY, JUNE 15TH:—MORNING, 9 TO 11.

A.—GRAMMAR.

1. Write the accusative singular and dative plural (with the article) of πολίτης, πλοῦς, πατρίς, σῶμα, Ἕλλην, μήτηρ, γένος, βασιλεύς, ἥρως, βοῦς.

2. Decline in the singular (with the article) γυνή, ναῦς, υἱός, πῦρ, κύων.

3. Decline in the plural (all genders) ἡδύς, μείζων.

4. Write the comparative and superlative of σαφής, πολύ, σοφή, παλαιός, καλός.

5. Write the present optative passive of τιμάω; the aorist subjunctive active of δίδωμι; the 1st sing. present (through all the moods) of οἶδα; the perfect middle and passive of πλέκω; the imperfect and future of εἰμί; the imperfect of εἶμι.

B.—COMPOSITION.

Translate into Greek:—

1. This man was made general by the great King.

2. Xenophon was leader during the whole retreat. κατάβασις).

3. The Greeks heard this before the battle from deserters.

4. The King will fight within ten days.

5. The arms of the soldiers were carried on waggons.

6. I persuaded the soldiers to obey Cyrus.

7. Men and soldiers let us be worthy of the freedom which we have acquired.

8. The commander-in-chief led his men by the shortest road, that they might not suffer harm.

9. The Greeks perceived that the enemy were in their camp.

10. The King thinks the Greeks are his, since he has them in the middle of his country.

FRENCH.

FRIDAY, JUNE 12TH:—MORNING, 9 TO 11.

1. Translate into French:—

I leave Paris at half past twelve to-night, and I shall be away a fortnight. You have very fine roses on this rose-tree, give me one for her. Why do you not sit down? I shall see you again to-morrow afternoon. Go and ask your friend to have the kindness to wait for me here. Please let me have this book, I really want it. I cannot give it to you for it has been lent to me. He is a friend of mine; you are nearly two years older than he. Whose book is this? I do not know whom you mean. He who tries to please everybody generally pleases nobody. Let us start at once, lest we should miss the train; it will not wait for us.

2. Give the singular of *baux, aieux, cieux;* the feminine of *grec, aigu, pêcheur, favori, vieux, âne, sage, doux, complet, attentif;* and the plural of *anneau, nez, oeil, régal, salle-à-manger, travail, gouvernail, lieu, clou, général, bétail,*

3. Give the comparative and the superlative of *bon, bien, mal, peu,* and translate into french *sooner or later; One of the finest books I have ever read; Upper and Lower Canada.*

4. Write in full the present indicative, preterite and the present subjunctive of *s'en aller, mourir, s'apercevoir, mettre, faire* and *dire.*

5. Give in English the equivalents of the following idiomatical expressions:—

Vous avez tort de m'en vouloir. C'est à lui qu'il

faut vous en prendre. J'ai beau chercher je ne vois rien qui vaille la peine que je me suis donnée, mais je voulais savoir à quoi m'en tenir. Pouvez-vous vous passer de lunettes pour lire?

6. Translate into English:—

Le vingt-sept août, mil sept cent quatre-vingt-treize, les royalistes du midi de la France livrèrent le port de Toulon aux Anglais. Pour le reprendre, le jeune Napoléon y fut envoyé en qualité de commandant d'artillerie, et après un siège resté célèbre, la ville se rendit. Ce fut pendant le siège que Napoléon rencontra Junot, qui devait plus tard rendre de grands services à l'empire. Un jour pendant que le jeune commandant d'artillerie faisait construire une batterie, il eut besoin d'écrire, et demanda un sergent ou un caporal qui pût lui servir de secrétaire. Il s'en présenta un aussitôt, et Napoléon, le faisant asseoir sur le terrain même, lui dicta sa correspondance. La lettre était à peine terminée qu'un boulet, qui tomba tout près, la couvrit de terre. "Bon, dit le soldat écrivain, je n'aurai pas besoin de sable." C'était Junot, et cette preuve de courage et de sang-froid suffit pour le recommander à son commandant, qui le poussa depuis aux premiers grades de l'armée.

7. Translate into French:—

The soldiers of Turenne worshipped him and regarded him as their father. One day when the army, in cold weather, was passing through a narrow valley, the marshal, who was exhausted by loss of sleep and fatigue, lay down beside a tree and fell asleep. Some of his soldiers, seeing him there and wishing to protect him against the cold and the snow, which was falling heavily, eagerly busied themselves in forming about him a hut of branches which they hastened to cover with their cloaks.

8. (Last half hour of the examination).

Reproduce in French the story read by the examiner.

STORY TO BE REPRODUCED IN FRENCH.

N.B.—At the beginning of the last half hour of the examination the presiding examiner will read distinctly the following story to the candidates twice. It is not to be placed in their hands.

Many years ago there lived in the city of Paris a

celebrated physician, who was very fond of animals. One day a friend of his brought to his house a favourite dog, whose leg had been broken, and asked him if he could do anything for the poor creature. The kind doctor examined the wounded animal, and, prescribing treatment for him, soon cured him, and received the warm thanks of his friend, who set a very high value upon his dog. Not very long afterwards, the doctor was in his room busy studying. He thought he heard a noise at the door, as if some animal was scratching in order to be let in. For some time he paid no attention to the noise, but continued studying. At last, however, he rose up and opened the door. To his great astonishment he saw enter the dog which he had cured, and with him another dog. The latter also had a broken leg, and was able to move only with great difficulty. The dog which the surgeon had cured had brought his friend to his benefactor, in order that he, too, might be healed; and, as well as he could, he made the doctor understand that this was what he wanted.

GERMAN.

FRIDAY, JUNE 12TH:—AFTERNOON, 2 TO 4.

1. Translate carefully:—

(*a*) „Lieber Mann," sagte die Frau, indem sie nicht wagte ihn anzusehen, „es ist ein Unglück passiert; den kleinen Vogel hat die Katze gefressen."

„Die Katze gefressen?" wiederholte der Mann, indem er starr vor Entsetzen wurde; „du lügst! Du hast die Nachtigall absichtlich fortgelassen! Das hätte ich dir nie zugetraut. Du bist eine schlechte Frau. Nun ist es für ewig mit unserer Freundschaft aus!"

(*b*) „Alterchen," erwiderte der Handwerksbursche schmunzelnd, „so fragt man die Bauern aus. Meinen schönen Traum behalte ich für mich; das könnt ihr mir nun schon gar nicht verdenken. Aber daraus werden thut doch nichts!" Und das sagte er nicht bloß so, sondern es war sein Ernst

2. Translate into German:—

(*a*) A king and a queen once had a son, whom they called Heino. (*b*) Every day he used to ride into the forest, but he never brought any animals he had killed home. (*c*) He was said to give all he found to the poor. (*d*) The truth is that he did not hunt at all, but visited a little house far away in the woods where lovely Blue-eyes lived. (*e*) When she saw him coming her whole face was filled with joy. (*f*) One day, however, the King sent a servent to follow Heino secretely, to find out why he never caught anything. (*g*) When he knew it, he wanted to have Blue-eyes killed, but a white dove came and called Heino. (*h*) He hastened to the little house and arrived soon enough to save Blue-eyes.

3. Grammar. (*Answer any four questions.*)

(*a*) Paſſiert (1*a*). What other verbs from the past participle without ge- ? What kind of verbs take the auxiliary ſein ? Give examples. Express in German :— "I have ridden all day."

(*b*) Decline in singular and plural Lieber Mann and Derſelbe Traum ; and write the nom. plur. of Frau, Nachtigall, Handwerksburſche, Katze.

(*c*) Write past (imperfect) indicative, 1st pers. sing. and past participle of lügen, behalten, können, verdenken, thun ; also (with the meaning) of liegen, legen, danken, kennen, betragen, betrügen, bitten, beten, bieten.

(*d*) Give as many derivative nouns (with meanings) as you can from the following verbs:—graben, kennen, ſprechen, binden, fliegen.

(*f*) How is the German language related to the English? Explain the general principles of the relation clearly, and give the English cognates of Vogel, Katze, freſſen, -ſchaft, -chen, daraus, ſondern, Baum, Knabe, Zahl.

4. Translate (*at sight*):—

„Wenn es nur das iſt," rief das Mädchen fröhlich, „ſo kann ich ihm vielleicht doch helfen. Der alte Mann ſchenkte mir ein

goldenes Herzchen, und das habe ich sorgfältig verborgen." Als der König das hörte, war er sehr erfreut. „Du bist also das Mädchen mit dem goldenen Herzen, das ich schon so lange suchte" rief er. „Keine andere durfte ich zur Königin machen und deshalb habe ich so lange warten müssen. Es sagten zwar manche, sie hätten ein goldenes Herz, aber wenn man es genauer ansah, so war es doch nicht von wirklichem Golde."

ALGEBRA, PART I.

TUESDAY, JUNE 9TH:—MORNING, 9 TO 11.

1. Solve the equations:—

(1) $\frac{x+25}{x-5} = \frac{2x+75}{2x-15}$

(2) $x+y=5,\ y+z=3,\ x+z=7.$

(3) $\frac{5x-7}{7x-5} = \frac{x-5}{2x-13}$

(4) $2x^2-3y^2=23,\ 2xy-3y^2=3.$

2. (*a*) Simplify and express with positive indices

$$\left\{ \frac{\sqrt[3]{a}}{\sqrt[4]{b}}^{-1} \times \left(\frac{b^{\frac{1}{4}}}{a^{\frac{1}{3}}} \right) \div \frac{a^{-\frac{1}{3}}}{b^{-\frac{1}{2}}} \right\}$$

(*b*) Find the value of

$$4\sqrt{128} - 5\sqrt{162} + \sqrt{338}$$

3. Shew that the difference between

$$\frac{x}{x-a} + \frac{x}{x-b} + \frac{x}{x-c} \text{ and } \frac{a}{x-a} + \frac{b}{x-b} + \frac{c}{x-c}$$

is the same for all values of x.

4. (*a*) Simplify $\frac{10x-11}{3(x^2-1} - \frac{10x-1}{3(x^2+x+1)} + \frac{x^3-2x+5}{^3-1)(x+1)}$

(*b*) Extract the square root of

$$x^6 - 22x^4 + 34x^3 + 121x^2 - 374x + 289.$$

5. A colonel wishing to form his men into a solid square finds he has 55 men over. If he increases the

side of the square by 1, he has forty men too few. How many men are there in the regiment?

6. Find four consecutive numbers such that the product of the first and last is less by 19 than the number which has the two middle ones for its digits.

GEOMETRY, *Part I.*

TUESDAY, JUNE 9TH:—AFTERNOON, 2 TO 4.

1. If a side of a triangle be produced, then the exterior angle shall be equal to the two interior opposite angles; also the three interior angles of a triangle are together equal to two right angles.

2. If a parallelogram and a triangle be on the same base and between the same parallels, the parallelogram shall be double of the triangle.

3. Describe a right angled isosceles triangle equal to a given square.

4. Divide a straight line into two parts so that the rectangle contained by the whole and one of the parts shall be equal to the square on the other part.

5. The sum of the squares on the diagonals of a parallelogram is equal to the sum of the squares on the sides.

6. Prove that the opposite angles of any quadrilateral inscribed in a circle are equal to two right angles. Also state and prove the converse.

7. If from any point without a circle a tangent and a secant be drawn, then the rectangle contained by the whole secant and the part of it without the circle shall be equal to the square on the tangent.

8. If from any external point two tangents be drawn to a circle, the angle contained by them is double the angle contained by the chord of contact and the diameter drawn through one of the points of contact.

GEOMETRY, PART II. AND ALGEBRA, PART II.

WEDNESDAY, JUNE 10TH:—AFTERNOON, 2 TO 4.

GEOMETRY.

1. Inscribe a regular pentagon in a given circle.

(*a*) Prove that the intersections of the alternate

sides of a regular pentagon are the vertices of another regular pentagon.

2. (*a*) Inscribe a circle in a given triangle.

(*b*) Draw an escribed circle to a given triangle, that is, a circle touching one side and the other two produced.

3. $A\,B\,C$ is a triangle, and the perpendicular $A\,D$ drawn from A to $B\,C$ falls within the triangle. Prove that if $A\,D$ is a mean proportional between $B\,D$ and $D\,C$, $B\,A\,C$ is a right angle. Prove also that if $A\,B$ is a mean proportional between $B\,C$ and $B\,D$ that $B\,A\,C$ is a right angle.

4. Equal triangles, which have one angle of the one equal to one angle of the other, have the sides about the equal angles reciprocally proportional.

ALGEBRA.

5. Find the sum of a number of terms in arithmetical progression. Find the arithmetical progression of 7 terms whose sum is 28 and common difference 3.

6. The area of a circle varies as the square of its radius. Given that the area is 154 sq. ft. when the radius is 7 ft., find the area when the radius is 10 ft. 6 in.

7. Find for what value of r the number of combinations of n things, r at a time, is the greatest.

8. (*a*) Find the first 5 terms of $(1 + x)^{\frac{3}{2}}$

(*b*) Prove $\log m^n = n \log m$.

9. Find the present value of an annuity to continue for a given number of years, allowing compound interest.

TRIGONOMETRY.

THURSDAY, JUNE 11TH:—MORNING, 11 TO 12.30.

1. Express all the trigonometrical ratios in terms of the secant. If the secant $= \frac{5}{3}$, calculate the other ratios.

2. Prove that a radian (the unit of circular measure) is equal to $\frac{180°}{\pi}$. Find the number of radians in 240°.

3. Prove the following relations:—

(*a*) $\sin (A - B) = \sin A \cos B - \cos A \sin B$.

(*b*) $\sin A - \sin B = 2 \cos \frac{A + B}{2} \sin \frac{A - B}{2}$

(*c*) $\frac{\sin 2A - \sin A}{\cos A - \cos 2A} \| \cot \frac{3A}{2}$

4. Solve the following trigonometrical equations and construct the angles obtained :—

(*a*) $3 \sin A - 2 \cos^2 A = 0$.

(*b*) $\tan \theta + 3 \cot \theta = 4$.

5. Find all the ratios of 75°.

6. Prove the following :—

(1) $\frac{1 - \sin A}{1 + \sin A} = (\sec A - \tan A)^2$

(2) $\sin (180 + A) = - \sin A$.

ENGLISH GRAMMAR AND TRENCH—(*Study of Words*).

MONDAY, JUNE 15TH:—AFTERNOON, 4 TO 5.30.

1. Define the term *spirant*. Give and classify six spirants, explaining the terms you use

or

state how compound nouns form their plural.

2. How are adverbs formed? Illustrate.

3. *Shall* and *will* as auxiliaries express (1) futurity, (2) determination: illustrate by writing the future tense of any weak verb. Illustrate the uses of the word *is*, and of the verb *do* as an auxiliary.

4. State and illustrate the uses of (*a*) *what*, (*b*) the various verbal forms in *ing*, (*c*) *elder*. Explain what is meant by the objective genitive and give two examples.

5. Give the signification of the following italicized suffixes and state the division (Teutonic or Romanic) to which each belongs: thimb*le*, act*or*, vix*en*, maid*en*, verb*ose*, god*head*, sweet*en*, partic*le*, govern*ess*.

6. What do the following words illustrate? Drepanum, micher, mob, sovereign, Sussex, quince, Wansbeck-water, marshal, Quaker, Derby.

7. How do new words arise? Illustrate.

8. Take these sets of synonymous words: *contrary, opposite; education, instruction; interference, interposition;* and distinguish between the meanings of the words in each set.

ENGLISH LITERATURE.

MONDAY, JUNE 8TH:—AFTERNOON, 2 TO 3.30.

Candidates for A. A. will answer three groups, namely: (1) *A or B;* (2) *C;* (3) *D.*

Candidates for Matriculation only, two groups, namely: (1) *A or B;* (2) *C.*

Ontario candidates will find instructions and questions on the third page.

A.—TENNYSON.

1. Name the poem in which each of the following extracts is found, and show in a few words how the passage exhibits the character of the poem:—

(*a*) And this gray spirit yearning in desire
To follow knowledge like a sinking star,
Beyond the utmost bound of human thought.

(*b*) We have a voice, with which to pay the debt
Of boundless love and reverence and regret.

(*c*) Prattling the primrose fancies of the boy,
To me that loved him.

(*d*) But thy strong Hours indignant work'd their wills,
And beat me down and marr'd and wasted me.

(*e*) All things have rest, and ripen toward the grave
In silence; ripen' fall and cease:

2. What can you say of Tennyson's diction? Illustrate from the poems studied.

3. Put in your own words the story of *The Lady of Shalott.* Add a short comment on the meaning and beauty of the poem.

B.—Scott.

1. Sketch, in a few lines each, the characters of Roderick Dhu, Brian the Hermit and Allan-Bane. With these as examples, discuss Scott's method of depicting character.

2. Show how the songs in The Lady of the Lake assist the action of the poem.

3. Make explanatory notes on the following: A stag of ten; poor remnants of the *Bleeding Heart;* Coir-nan-Uriskin; Kerne; glaive; the wily *quarry* shunned the shock; Tine-man; snood; Beltane game; witch-elm.

C.—Shakspere.

1. Describe briefly in your own words the hostile encounter of Mowbray and Bolingbroke in Act I. From this quarrel and the King's termination of it, what idea do you gain of the three characters concerned?

2. Make explicit notes on the meaning of italicized words in the following lines:

(*a*) To *ear* the land that hath some hope to grow.
(*b*) Look on my wrongs with an *indifferent* eye.
(*c*) And yet we strike not, but *securely* perish.
(*d*) *Imp* out our drooping country's broken wing.
(*e*) The grass whereon thou tread'st, the *presence strewed.*
(*f*) Like to a tenement or *pelting* farm.
(*g*) Razed out my *imprese,* leaving me no sign.

3. By whom and in what connection were the following spoken?

(*a*) Thus play I in one person many people,
And none contented.
(*b*) There is no virtue like necessity.
(*c*) I speak to subjects, and a subject speaks,
Stirr'd up by God, thus boldly for his King.
(*d*) Truth hath a quiet breast.
(*e*) Comfort's in heaven; and we are on the earth,
Where nothing lives but crosses, cares and grief.

D.—Stopford Brooke.

1. What was the most important work of each of the following? Give approximate dates. Baeda, Wyclif,

Bacon, Bunyan, Johnson.

2. Write briefly on the leading events of Shakspere's life, and mention his most important plays in their order of production.

3. What can you say of the character of Milton? How is this character reflected in his work?

4. By whom and in what period was each of the following written?

Legende of Good Women; Arcadia; Gulliver's Travels; The Spectator; Rime of the Ancient Mariner. Give in a few lines each, some account of the three last named works.

FOR ONTARIO CANDIDATES.

COLERIDGE, *The Ancient Mariner;* WORDSWORTH, *Selections;* SHAKSPERE, *The Merchant of Venice.*

1. What is the moral lesson to be drawn from the story of the Ancient Mariner? Quote, or give the substance of the lines in which it is summed up.

2. What do you suppose to be Coleridge's purpose in introducing the wedding guest and bridal party?

3. Give in your own words an account of the mariner's penance. What means does Coleridge use to heighten its awful effect?

4. Write out any one of Wordsworth's sonnets, and add a few lines of comment upon it, *or* write a short criticism upon Wordsworth as a writer of sonnets.

5. What qualities characteristic of Wordsworth can be found in the poem of *Michael?*

6. In what poem does each of the following passages occur?—

(*a*) A privacy of glorious light is thine.

(*b*) There is a comfort in the strength of love;
'Twill make a thing endurable, which else
Would overset the brain, or break the heart.

(*c*) And beauty born of murmuring sound shall pass into her face.

(*d*) For old, unhappy, far-off things
And battles long ago.

(*e*) Thou wander'st the wide world about
Unchecked by pride or scrupulous doubt.

6. Give the substance of Shylock's speech beginning: "To bait fish withal; if it feed nothing else it will feed my revenge." Distinguish between what may be justified in it and what is to be condemned.

7. Name the speaker of each of the following passages, and give some idea of the context:—

(*a*) The world is still deceived with ornament.

(*b*) God made him, and therefore let him pass for a man.

(*c*) How many things by season season'd are
To their right use and due perfection!

(*d*) Let none presume
To wear an undeservèd dignity.

(*e*) The weakest kind of fruit,
Drops earliest to the ground.

COLLIER'S "GREAT EVENTS OF HISTORY."

TUESDAY, JUNE 16TH:—MORNING, 11 TO 12.30.

(*Answer any five of the first eight questions, and question 9.*)

1. Describe the war of Titus with the Jews.

2. Discuss the main features of domestic life at Rome under the Empire.

3. Write on the Holy Roman Empire *or* the Byzantine Empire.

4. Give some account of the Italian Republics, with special reference to Venice and Florence.

5. Sketch the rise of the Dutch Republic.

6. Outline the main events of the reign of Louis XIV., prior to 1678.

7. Recite the leading achievements of Frederick the Great.

8. What do you know about the history of France since 1815?

9. Make brief notes on: Valerian's Edict, 258; Belisarius at Carthage; the Capture of Mecca, 629; Wittikind; the Seventh Crusade; Pizarro; the Smalkaldic War; the Regency of Marie de Medici; the Treaty of Ryswick; the Battle of Navarino.

GREEK AND ROMAN HISTORY.

TUESDAY, JUNE 16TH:—MORNING, 11 TO 12.30.

PART I.

(*Answer any two of the first three questions, and question 4.*)

1. Write what you know about the history of the Peloponnesus prior to 480 B.C.

2. Sketch the history of Athens from 480 to 430 B.C.

3. Describe the rise of Macedonia up to 336 B.C.

4. Make brief notes on: Perioeki and Helots; Tribes and Demes at Athens; the battle of Lade; Dekeleia; the Peace of Antalkidas.

PART II.

(*Answer any two of the first three questions, and question 4.*)

1. Give a list of Roman magistracies, mentioning where you can the circumstances under which each came into existence, and adding (with dates) the names of the most illustrious men who at different times filled these magistracies.

2. Describe in detail the part which Hamilcar Barca and other members of his family took in the Punic Wars.

3. Sketch the main features of Roman history from 100 to 44 B.C.

4. Make brief notes on:

The Laws of Lycinius and Sextius; the war with the Greek cities; the Roman Conquest of Spain; the reforms of Caius Gracchus; the evils of Imperial Government.

PHYSIOGRAPHY.

MONDAY, JUNE 8TH:—AFTERNOON, 3.30 TO 5

1. Contrast and account for the differences in the length of day and night (1) in north latitude 40°, (2) in north latitude 80°.

2. What are the Doldrums, the Trade winds? Explain their occurrence.

3. Sketch the general course of the currents in the Indian Ocean (*a*) in July, (*b*) in January.

4. Describe and explain the formation of some particular Coastal Plain such as that of Alabama, or of Bengal. Give instances of such formations found far inland.

5. Contrast the character and mode of formation of the Jura Mountains and the Black Hills of Dakota; *or else* write shortly on the origin of mountains.

6. Name and write shortly about a particular instance of each of the following:—Barrier Reef, Glacier, Hot Springs, Delta, Alluvial Fan or Cone.

7. What are the principal agents in Erosion of the land?

8. Explain the production of the Tides. Why are there no tides in the Mediterranean?

9. Name some special forms of animal life characteristic of (1) the Atlantic sea-bottom, (2) the Arctic circle, (3) tropical South America.

PHYSICS.

TUESDAY, JUNE 9TH:—AFTERNOON, 4 TO 5.30.

(*Candidates may select either the A or the B paper.*)

A.

1. Explain the terms:—*Viscosity, Malleability, Adhesion,* and give one experimental illustration of each.

2. Describe the Mercury Barometer, and explain how it measures the pressure of the atmosphere.

The specific gravity of mercury is 13.6, and a cubic foot of water weighs 1000 ounces. What is the increase of pressure on a square foot exposed to the atmosphere when the barometer rises one inch?

3. Explain how to find the specific gravity of a solid by means of the hydrostatic balance.

A substance weighs 24 grams in air and has a specific gravity of 11.35. What will it weigh in water?

4. Explain how a small force can overcome a greater one by means of a moveable pulley. Does this enable a man to double the amount of *work* he can do?

Define a foot-pound; a horse-power.

5. A force which could sustain a weight of 5 lbs. is applied to a mass of 20 lbs. for 10 seconds. What will be the speed at the end of the ten seconds and how far will the mass have moved?

6. Describe the construction of a mercury thermometer.

If the freezing and boiling points were marked 0° and 90° respectively, what would the thermometer read when a Fahrenheit thermometer read 64°?

7. Explain briefly:—

(*a*) Why metal objects seem hotter than wooden ones in the hot room of a Turkish Bath.

(*b*) The cooling effect when you moisten the back of the hand and blow upon it.

(*c*) The system of warming houses by means of hot water coils.

8. How much ice at 0°C can be melted by 20 kilograms of water at 100°?

B.

Gregory and Simmons.

1. How would you prove that air contains water vapour? Describe the method of measuring the relative humidity by means of the wet and dry bulb thermometers.

2. Describe an experiment to prove that water expands in cooling from 4°C to the freezing point.

3. Define the Specific Heat of a substance.

40 gms. of copper (sp. ht. = .09) at 22°C are placed in 80 gms of water at 100°C. What is the resulting temperature?

4. Briefly explain:—

(*a*) The cooling effect when the back of the hand is moistened and blown upon.

(*b*) The use of a flannel "cosy" to keep a teapot hot and to preserve ice from melting.

(*c*) The system of heating houses by hot water coils.

5. Two pieces of iron are hung, one in air in a vessel containing water that has been long boiled, the other in the water itself. What happens, and why?

6. Describe a method for preparing oxygen, and give its properties.

7. How is lime prepared from chalk, and how does the one differ from the other? Explain how mortar is made and what goes on when it "sets."

8. What are the causes of *permanent* and *temporary* hardness in water, and how can each be got rid of?

CHEMISTRY.

FRIDAY, JUNE 12TH:—AFTERNOON, 4 TO 5.30.

(*Answer only two questions in each group.*)

A.

1. What are the normal constituents of atmospheric air, and what the functions of each in nature? How would you prove experimentally that air has weight?

2. How may oxygen gas be prepared? Distinguish carefully between its chemical and its physical properties.

3. Write three equations expressing chemical reactions.

B.

1. What is the principal compound of nitrogen and hydrogen? How is it prepared? What are its properties?

2. What do you understand by families of elements? Give a number of illustrations.

3. Explain any four of the following terms:—Kindling temperature, combining weight, valence, acid, base.

C.

1. How is nitric acid obtained from saltpetre? Explain what takes place by means of an equation. How much acid could be obtained from 50 grams of saltpetre?

2. What are hydrocarbons? Describe the preparation of any one of them.

3. How does bromine occur in nature? How may it be obtained from sodium bromide? What are its properties? Compare them with those of chlorine.

BOTANY.

WEDNESDAY, JUNE 10TH:—AFTERNOON, 4 TO 5.30.

1. Describe as fully as you can, the special nature of the subjects treated of by Systematic Botany, Morphology, and Physiology.

2. What part of the plant is represented by the common potato? State how this structure may be distinguished from other underground organs.

3. What is the distinction between Cross-pollination and Self-pollination? Describe some of the more common methods for securing the former and preventing the latter.

4. Describe as fully as you can, the differences in structure of the flower and the leaf, which distinguish the Monocotyledons from the Dicotyledons.

5. What chemical elements usually enter into the composition of plant foods? State as exactly as you can, the various sources from which they are derived.

6. Write a short essay upon the field buttercup, giving

(*a*) Its scientific name and the name of the family to which it belongs.

(*b*) A description of its appearance, mode of growth and habitat.

(*c*) Any information you possess respecting its uses and properties.

GEOMETRICAL AND FREEHAND DRAWING.

TUESDAY, JUNE 16TH:—AFTERNOON, 2 TO 5.

PART I.

1. The perpendiculars from two points, *A* and *B*, to a straight line, measure respectively one inch and one and one-half inches. *A* to *B* measures two inches. Find a point *M* in the line such that *AM* and *MB* shall make equal angles with the line.

2. Construct a triangle having a base of 2 inches, an altitude of 3 inches and an angle of 30° opposite the base.

3. Inscribe a heptagon in a circle of 3 in. diameter.

4. A circle of one inch diameter rolls on the outer circumference of a circle of 3 in. diameter. Find one loop of the curve traced by a point one inch distant from the centre of the rolling circle and moving with it.

PART II.

5. Make a copy of the drawing before you, enlarged to about twice its size.

6. Make a drawing representing a skeleton cube, when below the level of the eye and to its left. One face of the cube is vertical and perpendicular to the line of sight (the line joining the eye to the centre of the picture plane).

7. Make an outline drawing of the capital of a column before you as it appears from your point of view. (A drawing in light and shade may be substituted for the outline drawing.) Make your drawing at least three inches in its shortest dimension.

PART III.

8. Make a pencil drawing of the moulding before you.

9. Make a drawing in water colour of the group of objects.

NOTE.—Marks will not be given in the problems of Part II. if instruments are used in the drawing. The object in question 7 is to be placed at a distance of four feet from the eye, resting on a surface one foot above the level of the eye. The vertical face of the plinth to the right of the candidate is to make an angle of 60° with the vertical plane passing through the eye and the centre of the object.

FIRST YEAR EXHIBITION

(*ARTS*)

EXAMINATION PAPERS.

JUNE, 1903.

B. EXHIBITIONS.

ENGLISH.

TUESDAY, JUNE 16TH:—MORNING, 9 TO 11.

1. "Latin *granum* is the same word as the English *corn*." Explain the significance of this statement as fully as you can.

2. At what periods have words from the Latin been introduced into English?

3. Outline L'Allegro *or* Lycidas, and quote from a dozen to twenty consecutive lines from either poem.

4. State precisely whence the following lines are taken, and give a short account of the context of each:—

(*a*) All is, if I have grace to use it so,
As ever in my great Task-Master's eye.
(*b*) But let my due feet never fail
To walk the studious cloister's pale.
(*c*) They also serve who only stand and wait.
(*d*) License they mean when they cry Liberty.
(*e*) And the repeated air
Of sad Electra's poet had the power
To save the Athenian walls from ruin bare.
(*f*) New *Presbyter* is but old *Priest* writ large.

5. Write an essay of three or four pages on *one* of the following subjects:—

(*a*) Macaulay as an Essayist.
(*b*) The English in India.
(*c*) The Character of Lord Byron.

LATIN.

WEDNESDAY, JUNE 17TH:—MORNING, 9 TO 11.

A.—GRAMMAR.

1. Decline in the sing. marking by the usual sign all long vowels:—accipiter, supellex, interpres, os, os, plebs, pecus, Ceres, pedester (all genders).

2. Give the corresponding forms in the other degrees of comparison for: frugi, nequius, potior, egenus, acre, idoneus, apertus, tutius, nuper, diu.

3. Give the Latin for: twenty-one years old; three thousand three hundred soldiers; many a victim; the Ubii alone; one camp; who of us; mindful of you; of what kind; how many?

4. Explain, by means of examples, the sequence of Tenses.

5. Give the principal parts and 1st sing. perf. ind. act. (all moods) of: edo, memini, domo, sero, iuvo, disco, emo, obliviscor orior.

B.—Composition.

Translate into Latin:—

The host of the enemy was so great, and their reputation for courage so pre-eminent, that Caesar refrained from a general engagement; still he determined to try skirmishes daily. Seeing, by the cavalry skirmishes, that his own men were not inferior, after fortifying the hill on which he had pitched his camp, he drew up six legions in battle order, no longer fearing that his men might be surrounded by the host of the enemy. For on each side of the hill he had drawn wide ditches and had built redoubts at the ends of them over against the enemy.

Translate with notes explaining the construction of words printed in italics:—

C.—Horace, Odes III.

(1) *Caelo* tonantem cre*didimus* Iovem
regnare: praesens divus habebitur
Augustus adiectis Britannis
imperio gravibusque Persis.
Milesne Crassi *coniuge barbara*
turpis maritus vixit et hostium
pro curia inversique mores!
consenuit socerorum in armis,
Sub rege Medo Marsus et Apulus,
anciliorum et nominis et togae
oblitus aeternaeque Vestae,
incolumi Iove et urbe Roma?

(2) Scan the first four lines and explain fully the allusion in Augustus, Persis, Miles Crassi, Marsus et Apulus, Vestae.

(3) Iam clarus occultum Audromedae pater
ostendit ignem, iam Procyon furit
et stella vesani Leonis,
sole dies referente siccos;
iam pastor umbras cum grege languido
rivumque fessus quaerit et horridi
dumeta Silvani, caretque
ripa vagis taciturna ventis:

4. Explain the allusion in Audromedae pater, Procyon, Stella Leonis, Silvani.

D.—Sight Translation.

(1) Quae civitates commodius suam rem publicam administrare existimantur, habent legibus sanctum, si quis quid de re publica a finitimis rumore aut fama acceperit, uti ad magistratum deferat neve cum quo alio communicet: quod saepe homines temerarios atque imperitos falsis rumoribus terreri et ad facinus impelli et de summis rebus consilium capere cognitum est. Magistratus quae visa sunt occultant; quaeque esse ex usu judicaverint, multitudini produnt. De re publica nisi per concilium loqui non conceditur.

(2) Omnia nunc florent; nunc est nova temporis aetas
Et nova de gravido palmite gemma tumet;
Et modo formatis amicitur vitibus arbos;
Prodit et in summum seminis herba solum;
Et tepidum volucres concentibus aera mulcent;
Ludit et in pratis luxuriatque pecus;
Tum blandi soles; ignotaque prodit hirundo,
Et luteum celsa sub trabe fingit opus;
Tum patitur cultus ager, et renovatur aratro;
Haec anni novitas jure vocanda fuit.

GREEK.

Thursday, June 18th:—Afternoon, 2 to 4.30.

A.—Grammar.

1. (*a*) Give the accusative singular and dative plural of ποιμήν, δελφίς, πῆχυς, κλείς, ὄρνις, μέλας (all genders), εὐγενής (all genders), πολύς (all genders).

(*b*) Give the genitive sing. and accusative plural of γαστήρ, ἦρως, γέρας, οὖς, χρυσοῦς (all genders), ἵλεως (all genders), διδούς (all genders).

2. Give the other degrees of comparison for ῥᾴων, αἴσχιστος, πρῶτος, ἐχθρός, εὔνους, ἐλάττων παλαιός, πολύν, μέγα, μείζω.

3. (*a*) Give the 3rd sing. perfect ind. pass.; 2nd sing. aor. ind. mid.; 3rd pl. imperf. ind. act.; 1st pl. fut. ind. mid.; present infin. act.; of διδάσκω, εὑρίσκω, καλῶ πράττω, φαίνω.

(*b*) Give the 2nd sing. impf. ind. act ; 2nd pl. fut. ind. mid.; 3rd sing. aor. ind. pass.; 3rd pl. pf. ind. pass. aor. infin. pass.; of δείκνυμι, ἔχω, ζεύγνυμι, πίμπλημι πίνω.

B.—Composition.

After this Cyrus marched on to the river Euphrates which was four stadia wide. When the soldiers heard that the march would be to Babylon, they said that they would not go. Cyrus, however, persuaded the greater part of the Greek army to follow, by promissing to give to each man a large amount of money as soon as they reached Babylon.

Now Menon wished to persuade his men to cross the river before the rest of the soldiers decided what they would do; "for," said he, "if you begin the passage of the river, Cyrus will honor you above the rest. Cyrus was pleased with Menon and his soldiers.

C.—Homer, Odyssey, VII.

Translate with notes on words underlined:—

(1) αὐτὰρ Ὀδυσσεὺς
Ἀλκινόου πρὸς δῶματ' ἴε κλυτά. πολλὰ δέ οἱ κῆρ
Ὥρμαιν' ἱσταμένῳ πρὶν χάλκεον οὐδὸν ἱκέσθαι.
Ὦις· τε γὰρ ἠελίου αἴγλη πέλεν ἠὲ σελήνης
Δῶμα καθ' ὑψερεφὲς μεγαλήτορος Ἀλκινόοιο.
Χάλκεοι μὲν γὰρ τοῖχοι ἐληλέδατ' ἔνθα καὶ ἔνθα,
Ἐς μυχὸν ἐξ οὐδοῦ, περὶ δὲ θριγκὸς κυάνοιο·
Χρύσειαι δὲ θύραι πυκινὸν δόμον ἐντὸς ἔεργον·

Σταθμοὶ δ' ἀργύρεοι ἐν χαλκέῳ ἕστασαν οὐδῷ
Ἀργύρεον δ' ἐφ' ὑπερθύριον, χρυσέη δὲ κορώνη.
(2) Αὐτὰρ ἐπεὶ στόρεσαν πυκινὸν λέχος ἐγκονέουσαι,
Ὤτρυνον Ὀδυσῆι παριστάμεναι ἐπέεσιν·
Ὄρσο κέων, ὦ ξεῖνε· πεποίηται δέ τοι εὐνή.
Ὣς φὰν, τῷ δ' ἀσπαστὸν ἐείσατο κοιμηθῆναι.

3. Scan the first two lines of (2).

D.—EURIPIDES, HECUBA (Sidgwick's Selections).

(1) ὦ φίλτατ', ἆρα κἄμ' ἐπισφάξαι τάφῳ
δοκοῦν Ἀχαιοῖς ἦλθες; ὡς φίλ' ἂν λέγοις.
σπευδωμεν, ἐγκονῶμεν, ἡγοῦ μοι, γέρον.
(2) τί δῆτα θνητοὶ τἄλλα μὲν μαθήματα
μοχθοῦμεν ὡς χρὴ πάντα καὶ μαστεύομεν,
πειθὼ δὲ τὴν τύραννον ἀνθρώποις μόνην
οὐδέν τι μᾶλλον ἐς τέλος σπουδάζομεν
μισθοὺς διδόντες μανθάνειν, ἵν' ἦν ποτε
πείθειν ἃ τις βούλοιτο, τυγχάνειν θ' ἅμα;
(3) τί δ'; οὐ γυναῖκες εἶλον Αἰγύπτου τέκνα,
καὶ Λῆμνον ἄρδην ἀρσένων ἐξῴκισαν;
ἀλλ' ὡς γενέσθω· τόνδε μὲν μέθες λόγον,
πέμψον δέ μοι τήνδ' ἀσφαλῶς διὰ στρατοῦ
γυναῖκα. καὶ σύ, Θρῃκὶ πλαθεῖσα ξένῳ,
λέξον, 'καλεῖ σ' ἄνασσα δή ποτ' Ἰλίου
Ἑκάβη, σὸν οὐκ ἔλασσον ἢ κείνης χρέος,
καὶ παῖδας·

E.—SIGHT TRANSLATION, XENOPHON.

Translate into English:—

Οἱ δὲ Θηβαῖοι εὐθὺς μετὰ τὴν μάχην ἔπεμψαν εἰς Ἀθήνας ἄγγελον ἐστεφανωμένον, καὶ ἅμα μὲν τῆς νίκης τὸ μέγεθος ἔφραζον, ἅμα δὲ βοηθεῖν ἐκέλευον, λέγοντες ὡς νῦν ἐξείη Λακεδαιμονίους πάντων ὧν ἐπεποιήκεσαν αὐτοὺς τιμωρήσασθαι. τῶν δὲ Ἀθηναίων ἡ βουλὴ ἐτύγχανεν ἐν ἀκροπόλει καθημένη. ἐπεὶ δ' ἤκουσαν τὸ γεγενημένον, ὅτι σφόδρα ἐλυπήθησαν πᾶσι δῆλον ἐγένετο· οὔτε γὰρ ἐπὶ ξενίᾳ τὸν κήρυκα ἐκάλεσαν, περί τε τῆς βοηθείας οὐδὲν ἀπεκρίναντο. καὶ Ἀθήνηθεν οὕτως ἀπῆλθεν ὁ κῆρυξ.

GREEK COMPOSITION AND TRANSLATION AT SIGHT.

THURSDAY, JUNE 18TH:—AFTERNOON, 2 TO 4.

(*Alternative paper for those who do not offer prescribed authors.*)

1. Translate into Greek:

(*a*) Good citizens give money to the wives of soldiers who have died for their country.

(*b*) I heard how large the country was.

(*c*) He said that the man who was present was his friend.

(*d*) Cyrus was a man capable of doing great things.

(*e*) The King is afraid that the Greeks will put the river in their rear.

(*f*) Cyrus was educated at the King's court, with the sons of the nobles. There, all who were personally acquainted with him agreed that he was the best of all in everything, and that he knew how to rule and obey. While he was satrap of Lydia and Phrygia, everybody had confidence in him, because he never broke his word, if he promised any one anything.

2. Translate into English:—

Ἐπεὶ δὲ οἱ Μαντινεῖς οὐκ ἤθελον καθαιρεῖν τὰ τείχη, Ἀγησίπολις πρῶτον μὲν τὴν γῆν ἐδῄου· ἔπειτα δὲ τάφρον ὤρυττε κύκλῳ περὶ τὴν πόλιν, τοῖς μὲν ἡμίσεσι τῶν στρατιωτῶν ἐν τοῖς ὅπλοις προκαθημένοις τῶν ταφρευόντων, τοῖς δ' ἥμισεσιν ἐργαζομένοις. ἐπεὶ δὲ ἐξείργαστο ἡ τάφρος, ἀσφαλῶς ἤδη ᾠκοδόμησε τεῖχος κύκλῳ περὶ τὴν πόλιν. αἰσθόμενος δὲ ὅτι ὁ σῖτος ἐν τῇ πόλει πολὺς ἐνείη, ἀπέχωσε τὸν διὰ τῆς πόλεως ῥέοντα ποταμὸν μάλ' ὄντα εὐμεγέθη. ἐμφραχθείσης δὲ τῆς ἀπορροίας τὸ ὕδωρ ᾔρετο ὑπέρ τε τῶν ὑπὸ ταῖς οἰκίαις καὶ ὑπὲρ τῶν ὑπὸ τῷ τείχει θεμελίων. βρεχομένων δὲ τῶν κάτω πλίνθων καὶ προδιδουσῶν τὰς ἄνω, τὸ μὲν πρῶτον ἐρρήγνυτο τὸ τεῖχος, ἔπειτα δὲ καὶ ἐκλίνετο. οἱ δὲ χρόνον μέν τινα ἀντήρειδον ξύλα καὶ ἐμηχανῶντο, ὡς μὴ πίπτοι ὁ πύργος· ἐπεὶ δὲ ἡττῶντο τοῦ ὕδατος, δείσαντες μὴ πεσόντος πη τοῦ τείχους δοριάλωτο γένοιντο, ὡμολόγουν περιαιρήσειν.

FRENCH.

THURSDAY, JUNE 18TH:—MORNING, 9 TO 11.

(*Questions asked in French must be answered in French.*)

1. Traduisez en français:—

I leave Paris at half past twelve to-night, and I shall be away a fortnight. You have very fine roses on this rose-tree; give me one for her. Why do you not sit down? I shall see you again to-morrow afternoon. Go and ask your friend to have the kindness to wait for me here. Please let me have this book, I really want it. I cannot give it to you for it has been lent to me. He is a friend of mine; you are nearly two years older than he. Whose book is this? I do not know whom you mean. He who tries to please everybody generally pleases nobody. Let us start at once, lest we should miss the train; it will not wait for us.

2. State clearly the rules and give examples of the agreement of (*a*) the past participle of reflexive verbs, (*b*) past participles conjugated with *avoir*, (*c*) past participles before an infinitive.

3. Give five different cases, with examples, in which the subjunctive in French is used.

4. Write in full the *present indicative*, *preterite* and the *present subjunctive* of *s'en aller*, *mourir*, *s'apercevoir*, *mettre*, *faire*, and *dire*.

5. Résumez la carrière de *Bernard* dans *Mademoiselle de la Seiglière*.

6. Donnez les équivalents anglais des expressions suivantes prises du *Siege de Paris*:—

Quel peu de fond il faut faire sur son bon sens! Parti pris de mensonge. Rompre en visière à quelqu'un. On fit flèche de tout bois. La vérité qui se fit bientôt jour, ne laissait pas d'être inquiétante. Faites l'appel nominal. C'est la seule souffrance dont aucun de nous n'ait pris son parti. Ce fut fait d'eux.

7. Faites un bref récit de la vie intime de Paris aux mois d'octobre et de novembre, pendant le siège:—Prix des vivres, la charité, les réfugiés.

8. Le Corfiote survint à propos pour me dispenser de répondre. Il amenait la femme de chambre de ces dames. C'était une Albanaise assez belle, malgré son nez camard. Deux brigands qui rôdaient dans la montagne l'avaient prise tout endimanchée, entre sa mère et son fiancé. Elle poussait des cris à fendre le marbre, mais on la consola bientôt en lui promettant de la relâcher sous quinze jours et de la payer. Elle prit son parti en brave et se réjouit presque d'un malheur qui devait grossir sa dot. Heureux pays, où les blessures du cœur se guérissent avec des pièces de cinq francs! Cette servante philosophe ne fut pas d'un grand secours à Madame Simons: de tous les travaux de son sexe, elle ne connaissait que le labourage. Quant à moi, elle me rendit la vie insupportable, par l'habitude qu'elle avait de grignoter une gousse d'ail par friandise et par coquetterie, comme les dames de Hambourg s'amusent à croquer des bonbons.—(*Le Roi des Montagnes.*)

9. Traduisez en français:—

Turenne, the famous general and marshal of France, was born in 1611, and was killed by a canon-shot in 1675. When a young man, he was challenged to a duel by another officer. What was his reply? "I cannot fight a duel," he answered, "for the laws forbid it. But I know as well as you, how to face danger when duty allows me. There is a bold stroke to be made, very useful and honourable for us, but very dangerous: let us go and ask our general for permission to attempt it, and we shall see which of us two will come off with the most honour." The officer who had proposed the duel considered the scheme so dangerous, in fact, that he refused to submit his valor to such a test.

GERMAN.

WEDNESDAY, JUNE 17TH:—AFTERNOON, 2 TO 4.

1. Translate *two* of the following sections:—

(*Candidates for C. Exhibitions to take* (*d*) *and one other.*)

(*a*) Aber eine dumpfe, quälende Begier, den Ort des Unheils von Angeſicht zu ſehen, erwachte in ihm und ließ ihm fürder

keine Ruhe mehr. Da überwand er die Abergläubische Scheu, die ihn bisher in Banden gehalten, und drang durch das Dickicht, welches den Pfad schützend verhüllte.

Der Schnee knirschte unter Boleslavs Füßen. Sein Atem wallte in lichten Wolken vor ihm her. Die Frostluft that seinem glühenden Gesichte wohl. Er suchte in einsamer Wanderung Ruhe und Klarheit zu gewinnen, denn in seinem Hirne brodelte es wie in einem Hexenkessel.

Was geschehen war, glich einer ehernen Kette von Schuld, in welcher seit Jahren ein Glied sich an das andere reihte. In diese Kette hineingefügt sollte alles, was Nacht und Schweigen gezeugt, in Nacht und Schweigen begraben sein. Begraben zugleich mit diesem Leichnam.

(*b*) Das Land ist schwer bedrängt—Warum, mein Oheim?
Wer ist's, der es gestürzt in diese Not?
Es kostete ein einzig leichtes Wort,
Um augenblicks des Dranges los zu sein,
Und einen gnäd'gen Kaiser zu gewinnen.
Weh ihnen, die dem Volk die Augen halten
Daß es dem wahren Besten widerstrebt!
Um eignen Vorteils willen hindern sie,
Daß die Waldstätte nicht zu Östreich schwören,
Wie ringsum alle Lande doch gethan. . . . .

Der König ritt herab vom Stein zu Baden,
Gen Rheinfeld, wo die Hofstatt war, zu ziehn,
Mit ihm die Fürsten Hans und Leopold
Und ein Gefolge hochgeborner Herren.
Und als sie kamen an die Reuß, wo man
Auf einer Fähre sich läßt übersetzen,
Da drängten sich die Mörder in das Schiff,
Daß sie den Kaiser vom Gefolge trennten.
Drauf, als der Fürst durch ein geackert Feld
Hinreitet,—eine alte große Stadt
Soll drunter liegen aus der Heiden Zeit—
Die alte Feste Habsburg im Gesicht,
Wo seines Stammes Hoheit ausgegangen—
Stößt Herzog Hans den Dolch ihm in die Kehle,
Rudolph von Palm durchrennt ihn mit dem Speer,

Und Eschenbach zerspaltet ihm das Haupt,
Daß er heruntersinkt in seinem Blut,
Gemordet von den Seinen, auf dem Seinen.

(*c*) Arnold suchte jetzt seine Begleiterin, die ihm gar so ernst vorkam, aufzuheitern, erzählte ihr von andern Orten, wo er gewesen, und wie es draußen in der Welt aussähe. Von den Telegraphen hatte sie keine Ahnung, und horchte aufmerksam und erstaunt seiner Erklärung; eben so wenig von all den neuern Erfindungen, und der junge Maler begriff nicht, wie es möglich sei, daß noch Menschen in Deutschland so abgeschieden, so förmlich getrennt von der übrigen Welt und außer der geringsten Verbindung mit ihr leben konnten. . . . .

Die andern lachten heimlich mit einander, der junge Bauer aber führte Arnold im ganzen Hause herum, das dicht gedrängt voll lustig schwärmender Gäste war. Erst kamen sie durch Zimmer, in denen Kartenspieler saßen und große Haufen Geldes vor sich liegen hatten, dann betraten sie die Kegelbahn, die mit hellglänzenden Steinen ausgelegt war.

(*d*) Ich bin Ihre Gebieterin, Tellheim; Sie brauchen weiter keinen Herrn. Sie verabschiedet zu finden, das Glück hätte ich mir kaum träumen lassen!—Doch Sie sind nicht bloß verabschiedet: Sie sind noch mehr. Was sind sie noch mehr? Ein Krüppel sagten Sie? Nun, der Krüppel ist doch noch ziemlich ganz und gerade; scheint doch noch ziemlich gesund und stark. Lieber Tellheim, wenn Sie auf den Verlust Ihrer gesunden Gliedmaßen betteln zu gehen denken, so prophezeie ich Ihnen, daß Sie vor den wenigsten Thüren etwas bekommen werden; ausgenommen vor den Thüren der gutherzigen Mädchen, wie ich. . . . .

Ich thue Euch zu wissen, daß der Handel, der mich um Eure Ehre besorgt machte, sich zu Eurem Vorteil aufgeklärt hat. Mein Bruder war des Näheren davon unterrichtet, und sein Zeugniß hat Euch für mehr als unschuldig erklärt. Die Hofstaatskasse hat Ordre, Euch den bewußten Wechsel wieder auszuliefern, und die gethanen Vorschüsse zu bezahlen; auch habe ich befohlen, daß alles, was die Feldkriegskassen wider Eure Rechnungen urgiren, niedergeschlagen werde. Meldet mir, ob Euch Eure Gesundheit erlaubt, wieder Dienste zu nehmen. Ich

möchte nicht gern einen Mann von Eurer Bravour und Denkungsart entbehren.

2. Translate into German:—

In ascending the upper half of the Brocken one cannot help (umhin) thinking of the interesting Brocken legends (die Sage) and of the great national tragedy of Dr. Faust. It seemed to me as though I could hear Mephisto with his cloven feet (Pferdefuß) walking along by my side. After a long and extremely exhausting (erschöpfend) ascent (der Aufstieg) we finally reached the summit (der Gipfel) Upon entering the hotel, I found it full of guests, and, fearing that I should have to put up (sich begnügen) with very poor (dürftig) accommodation (das Quartier) for the night, I immediately dropped into a chair and with a faint (schwach) voice called for a glass of water; whereupon the landlord was sensible (vernünftig) enough to see that so sick a man needed (bedürfen) a good bed for the night, even if someone else had to go (sich behelfen) without it.

3. Answer any *four* questions.

(*Candidates for C. Exhibitions to take* (*f*) *and three others.*)

(*a*) Haufen Geldes (1*c*) Have you any remark to make on this construction? Express in German:—*The fear of the enemy—a friend of mine—both of us—none of them.*

(*b*) Führen, drängen, lächeln, setzen, horchen. What are these verbs derived from? Are widerstrebt, übersetzen, (1*b*) separable or inseparable? Explain the rule governing such verbs.

(*c*) Write following in *Oratio obliqua:*—Er sagte zu ihr: „Komme nicht zu spät, denn ich kann nicht lange auf dich warten. Ich kam gestern spät an."

(*d*) How are the adjectives solch, welch, ganz used in German? Give examples. Translate:—*Whoever you are, it's the same to me—go away at once* (in *three* ways).

(*e*) Parse lassen in 1*d*. Why is Er hat mich rufen lassen ambiguous?

(*f*) Explain the allusion in der bewußte Wechsel (1*d*) and its connexion with the plot of the play.

4. Translate (*at sight*):—

Diese Worte kamen aus der gefühlvollen Brust meines Zimmergenossen, des jungen Kaufmanns. Ich gelangte dadurch wieder zu meiner Werkeltagsstimmung, war jetzt im stande, den Damen über den Sonnenuntergang recht viel Artiges zu sagen, und sie ruhig, als wäre nichts passiert, nach ihrem Zimmer zu führen. Sie erlaubten mir auch, sie noch eine Stunde zu unterhalten. Wie die Erde selbst, drehte sich unsere Unterhaltung um die Sonne. Die Mutter äußerte, die in Nebel versinkende Sonne habe ausgesehen wie eine rotglühende Rose, die der galante Himmel herabgeworfen in den weitausgebreiteten, weißen Brautschleier seiner geliebten Erde. Die Tochter lächelte und meinte, der öftere Anblick solcher Naturerscheinungen schwäche ihren Eindruck.

GEOMETRY, PART II AND ALGEBRA, PART II.

WEDNESDAY, JUNE 10TH:—AFTERNOON, 2 TO 4.

GEOMETRY.

1. Inscribe a regular pentagon in a given circle.

(*a*) Prove that the intersections of the alternate sides of a regular pentagon are the vertices of another regular pentagon.

2. (*a*) Inscribe a circle in a given triangle.

(*b*) Draw an escribed circle to a given triangle, that is, a circle touching one side and the other two produced.

3. ABC is a triangle, and the perpendicular AD drawn from A to BC falls within the triangle. Prove that if AD is a mean proportional between BD and DC, BAC is a right angle. Prove also that if AB is a mean proportional between BC and BD that BAC is a right angle.

4. Equal triangles, which have one angle of the one equal to one angle of the other, have the sides about the equal angles reciprocally proportional.

ALGEBRA.

5. Find the sum of a number of terms in arithmetical progression. Find the arithmetical progression of 7 terms whose sum is 28 and common difference 3.

6. The area of a circle varies as the square of its radius. Given that the area is 154 sq. ft. when the radius is 7 ft., find the area when the radius is 10 ft. 6 in.

7. Find for what value of r the number of combinations of n things, r at a time, is the greatest.

8. (*a*) Find the first 5 terms of $(1 + x)^{\frac{3}{2}}$

(*b*) Prove $\log m^n = n \log m$.

9. Find the present value of an annuity to continue for a given number of years, allowing compound interest.

TRIGONOMETRY.

THURSDAY, JUNE 11TH:—MORNING, 11 TO 12.30.

1. Express all the trigonometrical ratios in terms of the secant. If the secant $= \frac{5}{3}$, calculate the other ratios.

2. Prove that a radian (the unit of circular measure) is equal to $\frac{180°}{\pi}$. Find the number of radians in 240°.

3. Prove the following relations:—

(*a*) $\sin (A - B) = \sin A \cos B - \cos A \sin B$.

(*b*) $\sin A - \sin B = 2 \cos \frac{A + B}{2} \sin \frac{A - B}{2}$

(*c*) $\frac{\sin 2A - \sin A}{\cos A - \cos 2A} = \cot \frac{3A}{2}$

4. Solve the following trigonometrical equations and construct the angles obtained:—

(*a*) $3 \sin A - 2 \cos^2 A = 0$.

(*b*) $\tan \theta + 3 \cot \theta = 4$.

5. Find all the ratios of 75°.

6. Prove the following:—

(1) $\frac{1 - \sin A}{1 + \sin A} = (\sec A - \tan A)^2$

(2) $\sin (180 + A) = - \sin A$.

C. EXHIBITIONS.

ENGLISH HISTORY.

MONDAY, JUNE 8TH:—AFTERNOON, 2 TO 3.30.

GREEN'S "*Short History of the English People.*"

Write upon any four of the following subjects:

1. Wessex and the Danes, 802-880.
2. The reign of Henry II.
3. English towns in the time of the Three Edwards.
4. England and Mary Stuart, 1560-72.
5. New England, 1620-1756.
6. The second Stuart Tyranny, 1682-88.
7. The character and career of the second Pitt.

ENGLISH LITERATURE.

MONDAY, JUNE 8TH:—MORNING. 9 TO 12.

(A and B to be written in separate books.)

A.

SHAKSPERE: *Merchant of Venice. As You Like It. Julius Caesar.*

1. State, as shortly and clearly as you can, the sources from which Shakspere drew the plots of the above plays.

2. Compare the characters of Rosalind and Celia; give your own impression of Jacques.

3. Write notes on the songs in *The Merchant of Venice* and *As You Like It.*

4. Explain the following:—"Black Monday," "Rialto," "Lupercal," "dark as Erebus," "a quintain," "the

golden world," "swam in a gondola," "we are the Jasons, we have won the fleece," "hard food for Midas," "the Hyranian deserts," "Hercules and Lichas."

5. State precisely where the following passages occur, giving full particulars of the speaker, occasion and context:—

(*a*) I had it of Leah when I was a bachelor: I would not have given it for a wilderness of monkeys.

(*b*) Yet am I inland bred
And know some nurture.

(*c*) What can be avoided
Whose end is purposed by the mighty gods?

(*d*) O good old man, how well in thee appears
The constant service of the antique world.

(*e*) A kind of boy, a little scrubbed boy.

(*f*) Mistrust of good success hath done this deed.

(*g*) When love begins to sicken and decay,
It useth an enforced ceremony.

(*h*) Peace, ho! the moon sleeps with Endymion
And would not be awaked.

(*i*) I see no more in you than in the ordinary
Of Nature's sale-work.

(*j*) If thou dost nod, thou break'st thy instrument.

B.

COLERIDGE: *Ancient Mariner;* WORDSWORTH: *Selections;* TENNYSON: *Selections.*

1. Make a brief outline of the story of the Ancient Mariner, and discuss Coleridge's treatment of it.

2. Judging from the poems studied, what can you say of Wordsworth's sympathy with animals; his ideas on national liberty? Illustrate as far as possible by quotation.

3. Refer each of the following passages to its context, and make a note where it seems necessary on the meaning or significance of the words:

(*a*) Who with a natural instinct to discern
What knowledge can perform is diligent to learn.

(*b*) The earth is constant to her sphere
And God upholds them all.

(*c*) And see the children sport upon the shore;
And hear the mighty waters rolling evermore,
(*d*) Stern law giver! Yet thou dost wear
The Godhead's most benignant grace.
(*e*) Of him who walked in glory and in joy
Following his plough along the mountain-side.
(*f*) And something also did my worth obtain;
For fearless virtue bringeth boundless gain.

4. In what poem is each of the following passages found? Give some idea of the context and make a note where the meaning is obscure:

(*a*) So keep I fair thro' faith and prayer
A virgin heart in work and will.
(*b*) Hear me, for I will speak, and build up all
My sorrow with my song, as yonder walls
Rose slowly to a music slowly breathed.
(*c*) Ask thou not my name:
No one can be more wise than destiny.
(*d*) This is a shameful thing for men to lie.
(*e*) And drill the raw world for the march of mind,
Till crowds at length be sane and crowns be just.
(*f*) But every hour is saved
From that eternal silence, something more,
A bringer of new things.

ENGLISH LANGUAGE AND COMPOSITION.

TUESDAY, JUNE 16TH:—MORNING, 9 TO 11.

(*A and B to be written in separate books.*)

A.—ENGLISH LANGUAGE: TOLLER'S OUTLINES.

1. Set forth clearly the relations of English to the other members of the Indo-European family of languages, and explain what is meant by Grimm's and Verner's "Laws."

2. Write out the following in modern English, and add what you know as to the date and authorship, making also careful notes as to inflectional and dialectical forms:—

A.

Vor bote a man conne Frenss, me telth of him lute;
Ac lowe men holdeth to Engliss & to hor owe speche yute.

Ich wene ther ne beth in al the world contreyes none,
That ne holdeth to hor owe speche bote Engelond one.
Ac wel me wot uor to conne bothe wel it is,
Vor the more that a man can, the more wurthe he is.

B.

Englysche men theygh hy hadde fram the bygynnynge thre maner speche, Southeron, Northeron, & Myddel speche (in the myddel of the lond) as hy come of thre maner people of Germania; notheles, by commyxstion & mellynge furst with Danes & afterward with Normans, in menye the contray longage ys apeyred, & som useth strange wlaffynge, chyterynge, harrynge & garrynge & grisbitinge.

C.

Pers mette upon a day
A pore man by the way,
As naked as he was bore,
That yn the se had alle lore
Pers was of reuful nerte,
He toke hys kyrtyl of, as smert,
And ded hyt on the man aboue
And bad hym were hyt for hys loue.

D.

Thanne longen folk to gon on pilgrimages
And palmers for to seeken straunge strondes,
To ferne halwes, kouthe in sondry londes,
And specially from every schires ende
Of Engelond, to Caunterbury they wende,
The holy blisful martir for to seeke,
That hem hath holpen when that they were seeke.

E.

On this gær wærd the king Stephen ded & bebyried ther his wif & his sune wæron bebyried æt Fauresfeld. that minstre hi makeden. Tha the king was ded. tha was the eorl beionde sæ, & ne durste nan man don other bute god for the micel eie of him. Tha he to Engleland com. tha was he underfangen mid micel wurtscipe. & to king bletcæd in Lundene on the Sunnendæi beforen midwinterdæi, & held thær micel curt.

F.

Where is it groundid expressli in scripture, that men mowe lete schaue her berdis? and how dare thei so lete, sithen it can not be founde expressli in holi scripture that thei oughten so lete, and namelich sithen it is founde in holi scripture that men leten her berdis growe withoute schering or schauyng, and also sithen it was the oolde usage thorugh al the world in cristendom?

B.—Composition.

Write an essay of not less than two pages on *one* of the following subjects:

1. Moral ideals in Tennyson.

2. Wordsworth and Coleridge as the poets of natural and supernatural description.

3. The character of Brutus as given by Shakspere.

LATIN.

Thursday, June 11th:—Morning, 9 to 11.

I.

Latin Grammar.

1. Decline vis, impetus, sol (in the plural), caro (in the sing.), plus.

2. Give the derivation of the following words, with explanation of the phonetic variations in each case: cogo, debeo, cunctus, examen, summus, segmentum, semestris, meridies.

3. What cases are wanting in most nouns of the fifth declension?

4. Give the comparative and superlative of idoneus, vetus, maledicus, parum.

5. Translate: with a thousand men, with two thousand men, a.d. VIII. Kal, Apr. Cn. Pompeio Magno M. Licinio Crasso cos. (Express the date according to our notation).

6. Give the principal parts of desino, veneo, tundo, tero.

7. Illustrate, by examples, in Latin, the principal forms of conditional sentences.

8. Explain the following constructions:

(*a*) sui colligendi facultas; (*b*) subsequebatur omnibus copiis; (*c*) plus septingenti capti; (*d*) Gallia est divisa (Caes. B. G. I. 1); (*e*) illud erat aptius, aequum cuique concedere; (*f*) hoc dum narrat, forte audivit.

II.

Cicero, Catiline Orations.

1. Translate:

Sed si quis est invidiae metus, num est vehementius severitatis ac fortitudinis invidia quam inertiae ac nequitiae pertimescenda? An cum bello vastabitur Italia, vexabuntur urbes, tecta ardebunt, tum te non existimas invidiae incendio conflagraturum? His ego sanctissimis rei publicae vocibus, et eorum hominum qui hoc idem sentiunt mentibus, pauca respondebo. Ego, si hoc optimum factu iudicarem, patres conscripti, Catilinam morte multari, unius usuram horae gladiatori isti ad vivendum non dedissem. Etenim si summi et clarissimi viri Saturnini et Gracchorum et superiorum complurium sanguine non modo se non contaminarunt, sed etiam honestarunt, certe verendum mihi non erat ne quid hoc parricida civium interfecto, invidiae mihi in posteritatem redundaret. Quod si ea mihi maxime impenderet tamen hoc animo fui semper, ut invidiam virtute partam gloriam, non invidiam putarem.

Classify the conditional sentences in this passage, explaining the mood and tense in each.

2. Give the date of the Second Oration, the circumstances under which it was delivered, and a brief outline of the speech.

3. Translate, with brief notes on italicised words:

Introducti autem Galli ius iurandum sibi et litteras ab Lentulo ad suam gentem data esse dixerunt: Lentulum sibi confirmasse, ex *fatis Sibyllinis haruspicumque* responsis, se esse tertium illum Cornelium, ad quem regnum huius urbis atque imperium pervenire esset necesse; *Cinnam* ante se et *Sullam* fuisse; eundemque dixisse fatalem hunc annum esse ad interitum huius urbis atque imperi, qui esset annus decimus post

virginum absolutionem, post *Capitoli autem incensionem* vicesimus.

4. What were the views expressed by Silanus, Caesar and Cicero respecting the sentence of the conspirators.

5. Translate:

Quantum facinus ad vos delatum sit videtis. Huic si paucos putatis adfinis esse, vehementer erratis. Latius opinione disseminatum est hoc malum: manavit non solum per Italiam, verum etiam transcendit Alpes, et obscure serpens multas iam provincias occupavit. Id opperimi sustentando ac prolatando nullo pacto potest. Quacumque ratione placet, celeriter vobis vindicandum est.

6. Write explanatory notes on the following words or phrases: Jupiter Stator, signa militaria, Allobroges, Saturnalia, pulvinaria, scribae quaestorii, aras Penatium, Comitia Centuriata, praetor peregrinus, equites equo publico, intercessio, quadringentiens sestertium, tabulae auctionariae.

LATIN.

THURSDAY, JUNE 11TH:—AFTERNOON, 2.30 TO 5.

A.—VIRGIL, AENEID I.-VI.

1. Translate:—

(*a*) At matres primo ancipites oculisque malignis
Ambiguae spectare rates, miserum inter amorem
Praesentis terrae, fatisque vocantia regna:
Cum dea se paribus per caelum sustulit alis,
Ingentemque fuga secuit suo nubibus arcum.
Tum vero attonitae monstris actaeque furore
Conclamant, rapiuntque focis penetralibus ignem;
Pars spoliant aras, frondem ac virgulta facesque
Coniciunt. Furit immissis Vulcanus habenis
Transtra per et remos et pictas abiete puppes.

(*b*) His demum exactis, perfecto munere divae,
Devenere locos laetos, et amoena vireta
Fortunatorum nemorum, sedesque beatas.
Largior hic campos aether et lumine vestit
Purpureo, solemque suum, sua sidera norunt.
Pars in gramineis exercent membra palaestris,

Contendunt ludo, et fulva luctantur arena;
Pars pedibus plaudunt choreas, et carmina dicunt:
Nec non Threicius longa cum veste sacerdos
Obloquitur numeris septem discrimina vocum;
Iamque eadem digitis, iam pectine pulsat eburno.

2. Translate with explanatory notes:

(*a*) Namque umeris de more habilem suspenderat arcum
Venatrix, dederatque comam *diffundere* ventis,
Nuda *genu*, nodoque sinus collecta fluentis.

(*b*) *Quod* te per superos et conscia numina veri,
Per si qua est quae restat adhuc mortalibus usquam
Intemerata fides, oro, miserere laborum
Tantorum, miserere *animi* non digna ferentis.

(*c*) Sic denique victor
Trinacria finis Italos mittere relicta.
Huc ubi delatus *Cumaeam* accesseris *urbem*,
Divinosque lacus, et Averna sonantia silvis,
Insanam vates aspicies, quae rupe sub ima
Fata canit, foliisque notas et nomina mandat.
Quaecumque in foliis descripsit carmina virgo,
Digerit in numerum, atque antro seclusa relinquit.

(*d*) Vade age, nate, voca Zephyros et labere *pinnis*
Dardaniumque ducem, *Tyria Carthagine* qui nunc
Expectat fatisque datas non respicit urbes,
Adloquere et celeris defer mea dicta per auras.

3. Scan the four lines of (*d*), and remark on any peculiarities of metre.

B.—Caesar, De Bello Gallico.

1. Translate:

(*a*) Cum uterque utrimque exisset exercitus, in conspectu, fereque e regione castris, castra ponebant. Dispositis exploratoribus, ne cubi effecto ponte Romani copias traducerent, erat in magnis Caesaris difficultatibus res, ne maiorem aetatis partem flumine impediretur; quod non fere ante autumnum Elaver vado transiri solet.

Explain the construction of *castris*, *partem*.

(*b*) Calones in proximum tumulum procurrunt. Hinc celeriter deiecti se in signa manipulosque coniciunt. Alii, cuneo facto, ut celeriter perrumpant censent, quoniam tam propinqua sint castra; et si pars aliqua circumventa ceciderit, at reliquos servari posse

confidunt; alii ut in iugo consistant atque eundem omnes ferant casum.

Explain the terms *signa, manipulos,* and *cuneo.*

(*c*)Ab hac repulsi Nervii vallo pedum novem et fossa pedum quindecim hiberna cingunt. Haec et superiorum annorum consuetudine ab nobis cognoverant, et quosdam de exercitu habebant captivos, ab his docebantur: sed nulla ferramentorum copia quae esset ad hunc usum idonea, gladiis cespitem circumcidere, manibus sagulisque terram exhaurire nitebantur.

Give the construction of *novem pedum, copia, esset, manibus sagulisque.* Derive *hiberna, circumcidere.*

(*d*) Et navium figura et remorum motu et inusitato genere tormentorum permoti, barbari constiterunt, ac paulum modo pedem retulerunt. Atque nostris militibus cunctantibus, maxime propter altitudinem maris, qui decimae legionis aquilam ferebat, contestatus deos ut ea res legioni feliciter eveniret: Desilite, inquit, milites, nisi vultis aquilam hostibus prodere: ego certe meum rei publicae atque imperatori officium praestitero.

Change the passage from "desilite" into Indirect Narration.

2. Translate, with brief notes on italicised forms:

(*a*) Posteaquam in volgus militum elatum est, qua *arrogantia* in colloquio Ariovistus usus omni *Gallia Romanis* interdixisset, impetumque in nostros eius equites fecissent eaque res colloquium ut *diremisset,* multo maior alacritas studiumque *pugnandi* maius *exercitui* iniectum est.

(*b*) Ubi circumiecta multitudine hominum totis *moenibus* undique in murum lapides iaci *coepti sunt* murusque defensoribus nudatus est, testudine facta portas succedunt.

3. Explain the following terms: turma, decumana porta, soldurii, primipulus, agger, pilum, legatus.

LATIN.

WEDNESDAY, JUNE 17TH:—MORNING, 9 TO 11.

A.

Translate into English:—

Paulo Fabio, L. Vitellio Coss., post longum saeculorum ambitum avis phoenix in Aegyptum venit,

praebuitque materiem doctissimis indigenarum et Graecorum multa super eo miraculo disserendi: de quibus congruunt, et plura ambigua sed cognitu non absurda, promere libet. Sacrum Soli id animal, et ore ac distinctu pinnarum a ceteris avibus diversum consentiunt, qui formam eius definiere. De numero annorum varia traduntur; maxime volgatum quingentorum spatium: sunt, qui asseverent mille quadringentos sexaginta unum interici; prioresque alites Sesostride primum, post Amaside dominantibus, dein Ptolemaeo, qui ex Macedonibus tertius regnavit, in civitatem cui Heliopolis nomen advolavisse, multo ceterarum volucrum comitatu novam faciem mirantium. Sed antiquitas quidem obscura: inter Ptolemaeum ac Tiberium minus ducenti quinquaginta anni fuerunt; unde nonnulli falsum hunc phoenicem neque Arabum e terris credidere, nihilque usurpavisse ex his, quae vetus memoria firmavit: confecto quippe annorum numero ubi mors propinquet, suis in terris struere nidum, ex quo fetum oriri; et primam adulto curam sepeliendi patris: neque id temere, sed sublato myrrhae pondere tentatoque per longum iter, ubi par oneri par meatui sit, subire patrium corpus, inque Solis aram perferre, atque adolere. Haec incerta et fabulosis aucta. Ceterum adspici aliquando in Aegypto eam volucrem non ambigitur.

B.

Translate into Latin:—

There was an illustrious Roman, Appius Claudius by name, who, on account of his great age and the loss of his sight, had ceased to attend the senate. But when he heard of the embassy from Pyrrhus, and the report prevailed that the senate was going to vote for the peace, he could not contain himself, but ordered his servants to carry him in his chair through the forum to the senate-house. When he was brought to the door, his sons and his sons-in-law received him and led him into the senate. A respectful silence was observed by the whole body in his appearance, and he delivered his sentiments in the following terms:— "Hitherto I have regarded my blindness as a misfortune, but now, Romans, I wish I had been as deaf as I am blind: for then I should not have heard of coun-

sels so ruinous to the glory of Rome." No sooner had he finished speaking than the senate voted unanimously for the war.

C.

Translate into English:—

Quam bene Saturno vivebant rege, priusquam
Tellus in longas est patefacta vias!
Nondum caeruleas pinus contempserat undas,
Effusum ventis praebueratque sinum,
Nec vagus ignotis repetens compendia terris
Presserat externa navita merce ratem.
Illo non validus subiit iuga tempore taurus,
Non domito frenos ore momordit equus,
Non domus ulla fores habuit, non fixus in agris,
Qui regeret certis finibus arva, lapis.
Ipsae mella dabant quercus, ultroque ferebant
Obvia securis ubera lactis oves.
Immiti saevus duxerat arte faber.
Nunc Iove sub domino caedes et vulnera semper,
Non acies, non ira fuit, non bella, nec ensem
Nunc mare, nunc leti mille repente viae.

FRENCH.

THURSDAY, JUNE 18TH:—MORNING, 9 TO 11.

(*Questions asked in French must be answered in French.*)

1. Faites bien connaître les emplois différents du passé défini et de l'imparfait de l'indicatif.

2. Indiquez la différence entre *plus* et *davantage*, *oui* et *si* (adv.). *C'est* et *il est*, *avant* et *auparavant*, *plus tôt* et *plutôt*.

3. Indiquez brièvement les règles touchant l'emploi du subjonctif et donnez des exemples.

4. Traduisez en anglais:—

J'ai causé une fois avec lui chez mon père, en 1789, lorsqu'on ne le connaissait que comme un avocat de l'Artois, très exagéré dans ses principes démocratiques. Ses traits étaient ignobles, son teint pâle, ses veines d'une couleur verte; il soutenait les thèses les plus absurbes avec un sang-froid qui avait l'air de la

conviction; et je croirais assez que, dans les commencements de la Révolution, il avait adopté de bonne foi, sur l'égalité des fortunes aussi bien que sur celle des rangs, de certaines idées attrapées dans ses lectures, et dont son caractère envieux et méchant s'armait avec plaisir. Mais il devint ambitieux lorsqu'il eut triomphé de son rival en démagogie, Danton, le Mirabeau de la populace. Ce dernier était plus spirituel que Robespierre, plus accessible à la pitié; mais on le soupçonnait avec raison de pouvoir être corrompu par l'argent, et cette faiblesse finit toujours par perdre les démagogues; car le peuple ne peut souffrir ceux qui s'enrichissent: c'est un genre d'austérité dont rien ne saurait l'engager à se départir.

(*Le Directoire.*)

5. Dites ce que vous savez de l'*Artois*, de *Danton*, de *Mirabeau*.

6. Donnez en anglais les équivalents des expressions suivantes prises des *Recits Merovingiens*:—

Les provisions en nature qui s'y trouvaient amassées. De gré à gré. Ils marchèrent sur Paris à grandes journées. Le roi, sorte d'esprit fort à demi sauvage. Il s'avisa de lui courir sus. Les gens de Sigulf se mirent à les poursuivre avec acharnement. animés soit par l'espérance de prendre à merci et de rançonner un fils de roi, soit?...Un homme de rien Son indignation fut celle d'un homme simple de cœur et fougueux de caractère qui découvre qu'on s'est joué de sa bonne foi.

7. Résumez la carrière de Frédégonde d'après les *Recits Mérovingiens*.

8. Traduisez en français:—

One of the greatest pleasures of life is conversation; —and the pleasures of conversation are of course enhanced by every increase of knowledge: not that we should meet together to talk of alkalies and angles, or to add to our stock of history or philology—though a little of these things is no bad ingredient in conversation; but let the subject be what it may, there is always a prodigious difference between the conversation of those who have been well educated and of those who have not enjoyed this advantage. Education gives fecundity of thought, copiousness of illustration, quick-

ness, vigour, fancy, words, images and illustrations, it decorates every common thing, and gives the power of trifling without being undignified and absurd. The subjects themselves may not be wanted upon which the talents of an educated man have been exercised; but there is always a demand for those talents which his education has rendered strong and quick.

SYDNEY SMITH.

GERMAN.

WEDNESDAY, JUNE 17TH :– AFTERNOON, 2 TO 4.

See "B" Exhibition Papers, page 86.

MATRICULATION EXAMINATIONS.

SEPTEMBER, 1903

FACULTIES OF ARTS, APPLIED SCIENCE AND MEDICINE.

Papers arranged in the order of subjects as stated in the Calendar.

MATRICULATION EXAMINATIONS

ENGLISH COMPOSITION.

WEDNESDAY, SEPT. 9TH:—MORNING, 11 TO 12.

Write an essay of not less than one page on any *one* of the following subjects:

Camp life.
Ambition.
The Spanish Armada.

ENGLISH DICTATION.

WEDNESDAY, SEPT. 9TH:—MORNING, 10.30 TO 11.

This manner of life grew so exquisitely pleasant, that he never had a moment heavy upon his hands; his nights were untroubled, and his days joyous, from the practice of temperance and exercise. It was his manner to use stated hours and places for exercises of devotion, which he performed aloud, in order to keep up the faculties of speech, and to utter himself with greater energy.

When I first saw him, I thought, if I had not been let into his character and story, I could have discerned that he had been much separated from company, from his aspect and gesture; there was a strong but cheerful seriousness in his look, and a certain disregard to the ordinary things about him, as if he had been sunk in thought. When the ships which brought him off the island came in, he received them with the greatest indifference with relation to the prospect of going off with them, but with great satisfaction in an opportunity to refresh and help them. The man frequently bewailed his return to the world, which could not, he said, with all its enjoyments, restore him to the tranquillity of his solitude.

ENGLISH GRAMMAR.

WEDNESDAY, SEPT. 9TH:—MORNING, 9 TO 10.30.

(N.B.—*Not more than two questions in each section are to be answered. B 6 and C 8 are compulsory, however, as failure in Analysis or Parsing will cause the rejection of the paper.*)

A.

1. Give the feminine of *marquis, fox, duke, author, wolf;* and the possessive plural of *ox, wharf, princess, lady, statesman.*

2. Turn the following sentences into the passive voice:—

(*a*) John was rowing the boat against a heavy wind.

(*b*) Do nothing without consideration.

(*c*) He had given a great deal of time to the work.

(*d*) He offered me a book, but I refused it.

(*e*) He has taken a step which he will always regret.

3. Give three examples each of (*a*) the Gerund; (*b*) the Present Participle; (*c*) the Past Participle.

B.

4 Explain as clearly as you can the relation of the English Language (*a*) to Latin; (*b*) to German.

5. State the main uses of *shall* and *will*, with examples.

6. Parse the words in italics in the following sentence:—

But thou, that didst *appear so fair*
To fond *imagination,*
Dost rival *in* the light of day
Her delicate creation.

C.

7. Correct the following sentences where you think it necessary, giving reasons:—

(*a*) Arthur, with his aunt and uncle, have gone to the country.

(*b*) Every passenger taking the ferry is requested to have their money ready.

(*c*) The flowers smelt sweetly, the birds sang gaily, and everything looked beautifully.

(*d*) He intended to have left earlier, but being interested, the time passed without him noticing it.

(*e*) This is the man as makes boats like you do.

8. Analyse the following:—

We can hardly at the present day understand what Menander meant, when he told a man who inquired as to the progress of his comedy that he had finished it, not having yet written a single line, because he had constructed the action of it in his mind.

ENGLISH HISTORY.

FRIDAY, SEPT. 11TH:—MORNING, 10.30 TO 12.

1. What were the main events in the history of English discovery and colonization from 1497-1700?

2. Indicate the causes of conflict between Charles I. and:

(*a*) The English Parliament;

(*b*) Scotland.

3. What were the chief stages in the conflict between England and Napoleon?

4. Sketch the industrial and economic history of England from 1770-1846.

5. Sketch the political career of George Canning, *or* Sir Robert Peel, *or* Lord Palmerston.

ARITHMETIC.

FRIDAY, SEPT. 11TH:—MORNING, 9 TO 10.30.

1 Simplify $\frac{3.5 - 1.8\dot{3}}{9.7 - 6.4} \times \frac{1}{7\frac{1}{1}} \div \frac{3.1 \times .10\dot{1}}{2.15}$

2. If by selling an article for $38.25, 8 per cent. is lost, what per cent. is gained or lost by selling it for $57?

3. How may $564 be divided among 7 men, 9 women, and 13 children, so that each man may receive twice as much as each woman and five times as much as each child?

4. (*a*) Find the present value of $295.60 due 3 mos. hence, interest being at 4 per cent. per annum. (*b*) Also find in what time any sum will double itself at 4 per cent. simple interest.

5. The adjacent sides of a rectangle are 8¼ and 13¼ inches. Find in centimetres one side of a square which has the same area as the rectangle.

ENGLISH LITERATURE.

WEDNESDAY, SEPT. 9TH:—AFTERNOON, 2.30 TO 4.

(Candidates will answer A or B and C; Ontario Candidates, D.)

A.—TENNYSON.

1. Discuss the qualities of Tennyson's poetry illustrated by the following poems: Dora; Recollections of the Arabian Nights; The Revenge.

2. Write on the character of Ulysses, as represented by Tennyson.

3. Name the poem in which each of the following quotations is found, and give some idea of the context:

(*a*) The gods are hard to reconcile;
'Tis hard to settle order once again.

(*b*) For tho' the giant ages heave the hill
And break the shore, and evermore
Make and break, and work their will.

(*c*) Dash'd on every rocky square
Their surging charges foam'd themselves away.

(*d*) In our school books we say,
Of those that held their heads above the crowd,
They flourish'd then or then.

(*e*) All its allotted length of days,
The flower ripens in its place.

B.—Scott.

1. Write on Scott's power of painting landscape. Illustrate freely by quotation.

2. Judging from Scott's account in The Lady of the Lake. what can you say of the state of the Scottish Highlands in the time of King James V.?

3. Name the speaker and give the context of each of the following:

(*a*) "Peace! peace! to other than to me,
Thy words were evil augury."

(*b*) 'Twere worth ten years of peaceful life,
One glance at their array!

(*c*) Who o'er the herd would wish to reign,
Fantastic, fickle, fierce, and vain?

(*d*) I cannot sleep on Highland brae,
I cannot pray in Highland tongue.

(*e*) To assail a wearied man were shame,
And stranger is a holy name.

C.—Shakspere: *Richard II.*

1. Quote or give the substance of John of Gaunt's speech on the greatness and degeneration of England. (Act II., sc. 1.).

2. Name the speakers of the following passages; give some idea of the context; and make brief notes on italicized words:—

(*a*) My comfort is that heaven will take our souls
And plague injustice with the pains of hell.

(*b*) Who are the violets now
That strew the green lap of the new come spring?

(*c*) Within my mouth you have engaol'd my tongue,
Doubly *portcullis'd* with my teeth and lips.

(*d*) Thy very *beadsmen* learn to bend their bows
Of *double-fatal* yew against thy state.

(*e*) With Cain go wander *thorough* shades of night.

3. Show the various steps by which King Richard was put down and Bolingbroke ascended the throne. Give your opinion as to the justice of these proceedings.

D.—For Ontario Candidates.

Coleridge: *The Ancient Mariner;* Wordsworth: *Selections;* Shakspere: *The Merchant of Venice.*

1. Compare the poetic quality of Coleridge with that of Wordsworth, illustrating your statements by direct references to various poems.

2. Discuss (*a*) Coleridge's use of colour; (*b*) his similes. Illustrate by quotations from *The Ancient Mariner.*

3. State the poem and the connection in which each of the following is found:

(*a*) True to the kindred points of Heaven and Home!

(*b*) The stream will not flow, and the hill will not rise.

(*c*) And they like Demi-gods are strong
On whom the Muses smile.

(*d*) A Life, a Presence like the Air,
Scattering thy gladness without care.

(*e*) He heard the South
Make subterraneous music, like the noise
Of bagpipes on distant Highland hills.

(*f*) There lives who can provide
For all his creatures.

(*g*) In our halls is hung,
Armoury of the invincible knights of old.

4. Write out any one of Wordsworth's sonnets *or* twelve consecutive lines of *The Ancient Mariner;* and add a few lines of comment.

5. Examine the character of Portia, chiefly by means of quotation or direct reference, and pass your own judgment upon it.

6. State the speaker and connection of each of the following:

(*a*) To do a great right, do a little wrong.

(*b*) The fool hath planted in his memory
An army of good words.

(*c*) All things that are,
Are with more spirit chasèd than enjoy'd.

(*d*) You teach me how a beggar should be answer'd.

(*e*) Thus ornament is but the guilèd shore

To a most dangerous sea.

7. Comment on the following:

(*a*) Therefore, Jew,
Though justice be thy plea, consider this,—
That in the course of justice, none of us
Should see salvation.

(*b*) There's not the smallest orb which thou behold'st
But in his motion like an angel sings,
Still quiring to the young-ey'd cherubins.

GREEK GRAMMAR AND COMPOSITION.

WEDNESDAY, SEPT. 16TH:—MORNING, 9 TO 11.

A.—GRAMMAR.

1. Decline ἱππεύς, γένος, πατήρ, Σαπφώ, λαγώς.

2. Give the dative and vocative singular, and the dative and accusative plural of γυνή, Ζεύς, θυγάτηρ, κύων, λέων.

3. Compare ταχύς, αἰσχρός, ἡσυχός and ῥᾴδιος.

4. Decline οὗτος, ὅστις, σύ.

5. Give in all numbers the present imperative of εἰμί, οἶδα, ἵημι; the perfect indicative passive of τύπτω φαίνω, σπείρω; the first person singular in all moods of the 1st Aorist passive of εὑρίσκω, ἔχω, καλέω and λαμβάνω.

B.—COMPOSITION.

Translate into Greek:—

1. The Greeks are braver than the barbarians.

2. Orontas has long been plotting against Cyrus.

3. The soldiers of Menon were the first to cross the river.

4. The generals were jealous, it seemed, of Clearchus.

5. I will not injure you or despoil you of your property.

6. It is impossible to escape without his knowledge.

7. It is evident that while you live you will make war upon me.

8. It is best to send some persons to ask him, in order that you may know clearly what his intentions are.

9. I will take such precautions that you shall no longer be able to do me any harm.

10. He was afraid that if he did what Cyrus had ordered, the King's army would surround the Greeks on both sides.

GREEK AUTHORS.

WEDNESDAY, SEPT. 16TH:—AFTERNOON, 2.30 TO 4.30.

(Candidates will write on either A or B, and C.)

A.—XENOPHON, ANABASIS I.

1. Translate, with notes on the construction of words underlined:—

(*a*) Ἐνταῦθ' ἔμεινεν ὁ Κῦρος καὶ ἡ στρατιὰ ἡμέρας εἴκοσιν· οἱ γὰρ στρατιῶται οὐκ ἔφασαν ἰέναι τοῦ πρόσω· ὑπώπτευον γὰρ ἤδη ἐπὶ βασιλέα ἰέναι. μισθωθῆναι δὲ οὐκ ἐπὶ τούτῳ ἔφασαν. Πρῶτος δὲ Κλέαρχος τοὺς αὑτοῦ στρατιώτας ἐβιάζετο ἰέναι. οἱ δ' αὐτόν τε ἔβαλλον καὶ τὰ ὑποζύγια τὰ ἐκείνου ἐπεὶ ἤρξατο προϊέναι. Κλέαρχος δὲ τότε μὲν μικρὸν ἐξέφυγε τὸ μὴ καταπετρωθῆναι·

(*b*) Ὅτι μέντοι ἀδικεῖσθαι νομίζει ὑφ' ἡμῶν οἶδα· ὥστε καὶ μεταπεμπομένου αὐτοῦ οὐκ ἐθέλω ἐλθεῖν, τὸ μὲν μέγιστον αἰσχυνόμενος, ὅτι σύνοιδα ἐμαυτῷ πάντα ἐψευσμένος αὐτόν· ἔπειτα [δὲ] καὶ δεδιὼς μὴ λαβών με δίκην ἐπιθῇ ὧν νομίζει ὑπ' ἐμοῦ ἠδικῆσθαι. Ἐμοὶ οὖν δοκεῖ οὐχ ὥρα εἶναι ἡμῖν καθεύδειν, οὐδ' ἀμελεῖν ἡμῶν αὐτῶν, ἀλλὰ βουλεύεσθαι ὅ τι χρὴ ποιεῖν ἐκ τούτων.

(*c*) Ἄνδρες, ἐὰν ἐμοὶ πεισθῆτε, οὔτε κινδυνεύσαντες οὔτε πονήσαντες τῶν ἄλλων πλέον προτιμήσεσθε στρατιωτῶν ὑπὸ Κύρου. Τί οὖν κελεύω ποιῆσαι; Νῦν δεῖται Κῦρος ἕπεσθαι τοὺς Ἕλληνας ἐπὶ βασιλέα· ἐγὼ οὖν φημι ὑμᾶς χρῆναι διαβῆναι τὸν Εὐφράτην ποταμὸν πρὶν δῆλον εἶναι ὅ τι οἱ ἄλλοι Ἕλληνες ἀποκρινοῦνται Κύρῳ. Ἢν μὲν γὰρ ψηφίσωνται ἕπεσθαι, ὑμεῖς δόξετε αἴτιοι εἶναι, ἄρξαντες τοῦ διαβαίνειν.

(*d*) Πρὸς ταῦτα ὁ Κῦρος εἶπε τοῖς παροῦσιν· Ὁ μὲν ἀνὴρ τοιαῦτα μὲν πεποίηκε, τοιαῦτα δὲ λέγει· ὑμῶν δὲ σὺ πρῶτος, ὦ Κλέαρχε, ἀπόφηναι γνώμην εἴ τί σοι δωκεῖ. Κλέαρχος δὲ εἶπε τάδε· Συμβουλεύω ἐγὼ τὸν ἄνδρα τοῦτον ἐκποδὼν ποιεῖσθαι ὡς τάχιστα ὡς μηκέτι δέῃ τοῦτον φυλάττεσθαι, ἀλλὰ σχολὴ ᾖ ἡμῖν τὸ κατὰ τοῦτον εἶναι τοὺς ἐθελοντὰς φίλους τούτους εὖ ποιεῖν. Ταύτῃ δὲ τῇ γνώμῃ ἔφη καὶ τοὺς ἄλλους προσθέσθαι. Μετὰ ταῦτα, ἔφη κελεύοντος Κύρου, ἔλαβον τῆς ζώνης τὸν Ὁρόντην ἐπὶ θανάτῳ ἅπαντες ἀναστάντες καὶ οἱ συγγενεῖς· εἶτα δὲ ἐξῆγον αὐτὸν οἷς προσετάχθη. Ἐπεὶ δὲ εἶδον αὐτὸν οἵπερ πρόσθεν προσεκύνουν· καὶ τότε προσεκύνησαν, καίπερ εἰδότες ὅτι ἐπὶ θάνατον ἄγοιτο.

(*e*) Τὰ δ' ἅρματα ἐφέροντο τὰ μὲν δι' αὐτῶν τῶν πολεμίων, τὰ δε καὶ διὰ τῶν Ἑλλήνων, κενὰ ἡνιόχων Οἱ δ' ἐπεὶ προΐδοιεν, διΐσταντο· ἔστι δ' ὅστις καὶ κατελήφθη ὥσπερ ἐν ἱπποδρόμῳ ἐκπλαγείς· καὶ οὐδὲν μέντοι οὐδὲ τοῦτον παθεῖν ἔφασαν· οὐδ ἄλλος δὲ τῶν Ἑλλήνων ἐν ταύτῃ τῇ μάχῃ ἔπαθεν οὐδεὶς οὐδέν, πλὴν ἐπὶ τῷ εὐωνύμῳ τοξευθῆναί τις ἐλέγετο.

2. Write the principal parts of ἐψευσμένος, ἐπιθῇ, ἀλῶσοιντο, πεισθῆτε.

B.—Xenophon, Anabasis II.

1. Translate with notes on the construction of words underlined:—

(*a*) Ταῦτα ἀκούσαντες οἱ στρατηγοὶ καὶ οἱ ἄλλοι Ἕλληνες βαρέως ἔφερον. Κλέαρχος δὲ τάδε εἶπεν, Ἀλλ' ὤφελε μὲν Κῦρος ζῆν· ἐπεὶ δὲ τετελεύτηκεν, ἀπαγγέλλετε Ἀριαίῳ ὅτι ἡμεῖς γε νικῶμεν βασιλέα, καί, ὡς ὁρᾶτε, οὐδεὶς ἔτι ἡμῖν μάχεται· καὶ εἰ μὴ ὑμεῖς ἤλθετε ἐπορευόμεθα ἂν ἐπὶ βασιλέα. Ἐπαγγελλόμεθα δὲ Ἀριαίῳ, ἐὰν ἐνθάδε ἔλθῃ, εἰς τὸν θρόνον τὸν βασίλειον καθιεῖν αὐτόν· τῶν γὰρ μάχην νικώντων καὶ τὸ ἄρχειν ἐστίν.

(*b*) Ἐγώ, ὦ ἄνδρες Ἕλληνες, γείτων οἰκῶ τῇ Ἑλλάδι· καὶ ἐπεὶ ὑμᾶς εἶδον εἰς πολλὰ κακὰ κἀμήχανα ἐμπεπτωκότας, εὕρημα ἐποιησάμην εἴ πως δυναίμην παρὰ βασιλέως αἰτήσασθαι δοῦναί μοι ἀποσῶσαι ὑμᾶς εἰς τὴν Ἑλλάδα. Οἶμαι γὰρ ἂν οὐκ ἀχαρίστως μοι ἔξειν οὔτε πρὸς ὑμῶν οὔτε πρὸς τῆς Ἑλλάδος ἁπάσης.

(*c*) Πρῶτον μὲν γὰρ καὶ μέγιστον οἱ θεῶν ἡμᾶς ὅρκοι κωλύουσι μὴ πολεμίους εἶναι ἀλλήλοις· ὅστις δέ τούτων σύνοιδεν αὑτῷ παρημεληκώς, τοῦτον ἐγὼ οὔποτ' ἂν εὐδαιμονίσαιμι. Τὸν γὰρ θεῶν πόλεμον οὐκ οἶδα οὔτ' ἀπὸ ποίου ἂν τάχους οὔτε ὅποι ἄν τις φεύγων ἀποφύγοι, οὔτ' εἰς ποῖον [ἂν] σκότος ἀποδραίη, οὔθ' ὅπως ἂν εἰς ἐχυρὸν χωρίον ἀποσταίη· Πάντη γὰρ πάντα τοῖς θεοῖς ὕποχα, καὶ πανταχῇ πάντων ἴσον οἱ θεοὶ κρατοῦσι.

(*d*) Τοῦτο δ' ἐποίει ἐκ τοῦ χαλεπὸς εἶναι· καὶ γὰρ ὁρᾶν στυγνὸς ἦν, καὶ τῇ φωνῇ τραχύς· ἐκόλαζέ τε αἰεὶ ἰσχυρῶς, καὶ ὀργῇ ἐνίοτε, ὥστε καὶ αὐτῷ μεταμέλειν ἔσθ' ὅτε. Καὶ γνώμῃ δὲ ἐκόλαζεν· ἀκολάστου γὰρ στρατεύματος οὐδὲν ἡγεῖτο ὄφελος εἶναι. Ἀλλὰ καὶ λέγειν αὐτὸν ἔφασαν ὡς δέοι τὸν στρατιώτην

φοβεῖσθαι μᾶλλον τὸν ἄρχοντα ἢ τοὺς πολεμίους.

(e) Στέργων δὲ φανερὸς μὲν ἦν οὐδένα, ὅτῳ δὲ φαίη φίλος εἶναι τούτῳ ἔνδηλος ἐγίνετο ἐπιβουλεύων. Καὶ πολεμίου μὲν οὐδενὸς κατεγέλα, τῶν δὲ συνόντων πάντων ὡς καταγελῶν ἀεὶ διελέγετο. Καὶ τοῖς μὲν τῶν πολεμίων κτήμασιν οὐκ ἐπεβούλευε· χαλεπὸν γὰρ ᾤετο εἶναι τὰ τῶν φυλαττομένων λαμβάνειν·

1. Write the principal parts of ἔλθῃ, δοῦναι, ἀποφύγοι, διελέγετο.

C.—Translation at Sight.

Translate into English:—

Ὦ ἄνδρες Μοσσύνοικοι, ἡμεῖς διασωθῆναι βουλόμεθα πρὸς τὴν Ἑλλάδα πεζῇ· πλοῖα γὰρ οὐκ ἔχομεν· κωλύουσι δὲ οὗτοι ἡμᾶς οὓς ἀκούομεν ὑμῖν πολεμίους εἶναι. Εἰ οὖν βούλεσθε, ἔξεστιν ὑμῖν ἡμᾶς λαβεῖν ξυμμάχους καὶ τιμωρήσασθαι εἴ τι πώποθ' ὑμᾶς οὗτοι ἠδίκησαν, καὶ τὸ λοιπὸν ὑμῶν ὑπηκόους εἶναι τούτους. Εἰ δὲ ἡμᾶς ἀφήσετε, σκέψασθε πόθεν αὖθις ἂν τοσαύτην δύναμιν λάβοιτε ξύμμαχον. Πρὸς ταῦτα ἀπεκρίνατο ὁ ἄρχων τῶν Μοσσυνοίκων ὅτι καὶ βούλοιντο ταῦτα καὶ δέχοιντο την ξυμμαχίαν.

LATIN—(*First Paper*).

Monday, Sept. 14th:—Morning, 9 to 11.

I. Latin Grammar.

1. Decline (marking by the usual sign all long vowels): templum, ager, nubes, calcar, gradus, acies. Decline together: equus acer, uxor fida. Decline in all genders and both numbers; miser, melior, duo, iste.

2. Give the gender, genitive and ablative sing., and gen. pl. of: puer, liber (a book), iudex, aestas, virtus, domus.

3. Give the comparative and superlative of: audax, tener, similis, celeber; graviter, saepe.

4. Express in Latin the following cardinal numbers, giving the corresponding Roman symbols: 19, 90, 314, 1903.

5. Write down the fut. indic. of sum, pres. subj. act. of moneo, imperative act. of audio, all the participles of hortor, gerund and gerundive of rego.

6. Principal parts of timeo, nascor, ulciscor, cano, divido, gaudeo, iaceo.

7. Give the Latin for: the rest of the army; it is my interest; I envy you; I am persuaded; he was killed by a sword by Milo.

II. Latin Prose Composition.

1. Father and sister were killed.

2. All good citizens will obey the laws of the Roman people.

3. He says that you made him consul.

4. When Caesar was in Gaul the Belgians began to conspire against the Romans.

5. Caesar, because he remembered that the consul Crassus had been slain, and his army routed and sent under the yoke by the Helvetians, did not think that the request ought to be granted; nor, moreover, did he believe that men whose feelings were hostile, if given leave to march through the province, would refrain from injury and evil-doing.

LATIN—(*Second Paper*).

Monday, Sept. 14th:—Afternoon, 2.30 to 4.30.

I. Nepos, Miltiades and Epaminandos.

1. Translate, explaining fully the construction of italicized words:

(*a*) Huius cum sententiam plurimi *essent secuti*, Miltiades non dubitans tam *multis consciis* ad regis

aures consilia sua perventura, Chersonesum relinquit ac rursus *Athenas* demigravit. cuius ratio etsi non valuit, tamen magno opere est laudanda, cum amicior omnium libertati quam suae fuerit dominationi.

(*b*) Huius de virtutibus vitaque satis erit dictum, si hoc unum adiunxero, quod nemo ibit infitias, Thebas et ante Epaminondam natum et post eiusdem interitum perpetuo alieno paruisse imperio, contra ea, quamdiu ille praefuerit rei publicae, caput fuisse totius Graeciae.

II. Caesar, De Bello Gallico I., II.

2. Translate, with notes on italicized words:

(*a*) *Boios* petentibus Aeduis, quod *egregia virtute* erant cogniti, ut in finibus suis collocarent concessit quibus illi agros dederunt quosque postea in parem iuris libertatisque conditionem atque ipsi erant receperunt.

(*b*) Ad haec Caesar respondit: Se magis consuetudine sua quam merito eorum civitatem conservaturum, si prius quam murum aries attigisset se dedidissent; sed deditionis nullam esse conditionem nisi armis traditis. Se id quod in Nerviis fecisset facturum finitimisque imperaturum, ne quam dedititiis populi Romani iniuriam inferrent.

III. Ovid.

3. Translate:

Quem procul a patria diverso maximus orbe
Excipit Eridanus fumantiaque abluit ora.
Naides Hesperiae trifida fumantia flamma
Corpora dant tumulo, signant quoque carmine saxum:
'Hic situs est Phaethon, currus auriga paterni
Quem si non tenuit magnis tamen excidit ausis.

4. Scan the first two lines of the last extract.

5. Translate with brief notes:

(*a*) Finierat Paean. Factis modo laurea ramis
Adnuit utque caput visa est agitasse cacumen.

(*b*) Non impune tamen scelus hoc sinit esse Lyacus:
Amissoque dolens sacrorum vate suorum,
Protinus in silvis matres Edonidas omnes.
Quae videre nefas, torta radice ligavit.

IV. Translation at Sight.

Cum iam muro turres appropinquassent, ex captivis Caesar cognovit Vercingetorigem consumpto pabulo castra movisse propius Avaricum, atque ipsum cum equitatu expeditisque, qui inter equites proeliari consuessent, insidiandi causa profectum quo nostros postero die pabulatum venturos arbitaretur. Quibus rebus cognitis media nocte silentio profectus ad hostium castra mane pervenit. Illi celeriter per exploratores adventu Caesaris cognito carros impedimentaque sua in silvas abdiderunt, copias omnes in loco edito atque aperto instruxerunt. Qua re nuntiata Caesar celeriter sarcinas conferri, arma expediri iussit.

ALTERNATIVE FOR SECTIONS I., II. AND III. OF LATIN—(*Second Paper.*)

Candidates taking this option are required to do Section IV. (Translation at Sight) of the regular paper.

Translate, explaining fully the syntax of italicised words:

(*a*) Huius rex animi magnitudinem admirans cupiensque talem virum sibi conciliari veniam dedit. Ille omne illud *tempus litteris* sermonique Persarum se dedidit: quibus adeo eruditus est, ut multo commodius *dicatur* apud regem verba fecisse, quam ii poterant, qui, in Perside erant nati. Hic cum multa regi esset pollicitus gratissimumque illud, si suis uti *consiliis* vellet, illum Graeciam bello oppressurum, magnis muneribus ab Artaxerxe donatus in Asiam rediit domiciliumque Magnesiae sibi constituit.

(*b*) Hic qua fuerit abstinentia, nullum est certius indicium quam quod, cum tantis *rebus* praefuisset, in tanta paupertate decessit, ut qui efferretur vix reliquerit. Quo factum est ut filiae eius publice *alerentur* et de communi aerario dotibus datis collocarentur.

(*c*) Caesar cognito *consilio* eorum ad flumen Tamesin in fines Cassivellauni exercitum duxit, quod flumen uno omnino loco *pedibus* atque hoc aegre transiri potest. Eo cum venisset animum advertit, ad alteram fluminis ripam magnas esse copias hostium instructas:

ripa autem erat acutis sudibus praefixisque munita, eiusdemque generis sub aqua defixae sudes flumine tegebantur. His rebus cognitis a captivis perfugisque Caesar praemisso equitatu confestim legiones subsequi iussit. Sed ea celeritate atque eo impetu milites ierunt, cum capite solo ex aqua exstarent, ut hostes impetum legionum atque equitum sustinere non *possent* ripasque dimitterent ac se fugae mandarent.

(*d*) Diverso interea miscentur moenia luctu;
et magis atque magis, quamquam secreta parentis
Anchisae domus arboribusque obtecta recessit,
clarescunt sonitus, armorumque ingruit horror.
Excutior somno, et summi fastigia tecti
adscensu supero, atque arrectis auribus adsto,
in segetem veluti cum flamma, furentibus Austris,
incidit, aut rapidus montano flumine torrens
sternit agros, sternit sata laeta boumque labores,
praecipitesque trahit silvas, stupet inscius alto
accipiens sonitum saxi de vertice pastor.
Tum vero manifesta fides, Danaûmque patescunt
insidiae.

Scan the first two lines.

FRENCH.

TUESDAY, SEPT. 15TH:—MORNING, 9 TO 11.

A.

1. Translate:

Enfin, à force de courage, je suis à une heure de Pont-à-Mousson, dont je vois la côte surmontée de ruines. Près de la route, s'élève un mur, bordé de quelques noyers et de gazon épais. C'est mon affaire, car il est temps de prendre un peu de repos. Le soleil est au-dessus de ma tête; mon estomac me dit qu'il est midi, mais il faut jeûner jusqu'à la ville où j'espère trouver quelques ressources. Je dispose donc mon sac, et je m'en sers comme d'un oreiller pour reposer ma tête. Bientôt le sommeil me saisit. Je ne sais depuis combien de temps je me livrais au-repos, quand ma tête, dans un brusque mouvement, frappa un corps dur. Je me lève aussitôt, et jugez de

ma surprise, en voyant que mon sac a disparu: en vain je regarde à droite, à gauche, rien; mon sac avait bien changé de maitre. Sur la route fuyait rapidement vers Nancy une de ces voitures à deux roues, couvertes d'une longue toile grise et trainée par un mulet, comme on en a vu beaucoup, à la suite de l'armée prussienne. Poussé par je ne sais quel pressentiment; je courus après cette charrette, et je vis mon sac précieusement installé sur les genoux d'un soldat.

2. Give the whole of the present indicative, and the 3rd person singular only of the present subjunctive and the future of voir, prendre, dire, espérer, servir, savoir, disparaître, couvrir.

3. Give the whole of the pluperfect indicative of s'asseoir.

4. Give the adverbs of the following: languissant, lent, généreux, frais, bon, mauvais, nouveau, pire, meilleur, précis.

5. Give a list of the conjunctions governing the subjunctive.

6. Translate:

Which of the servants will go? Some of the finest houses in this town have been burnt. The traveller had to return. He thought he was right. Are you looking for your book? Do you know French? You may go as soon as you have finished your work. I have not seen very many horses that I like better than these. What are you talking about? What do you want? What prevents you from answering my question? I know what you bought a fortnight ago. It has been snowing since last week.

7. Translate:

Malec had just obtained a victory over the Greeks, and had taken their emperor in battle. Having had this prince brought into his tent he asked him what treatment he expected from the conqueror. "If you make war like a king," answered the emperor, "send me back again; if you wage it like a merchant, sell me; if you wage it like a butcher, slaughter me."

B.

8. Reproduce in French the story read by the examiner.

At 10.30 the presiding examiner will twice read the following passage to the candidates. It is on no account to be placed in their hands, nor will the candidates be allowed to take notes during the reading.

Reproduce in French:

Henry V. was as brave a King as ever sat on the English throne, and gained one of the greatest victories ever won by English soldiers. But when he was Prince of Wales, he was a very wild and riotous youth. He mixed with low companions, who led him to do many base and foolish acts, quite unworthy of a prince. On one occasion, one of his friends was tried for some offence before a judge. He was found guilty, and was ordered to be sent to prison. When the Prince, who was in court, heard the sentence, he fell into a great rage. He spoke very readily to the judge, and commanded him to let his friend off. "Prison," he said, "is no place for a Prince's friend. I forbid you to send this man to prison like a common thief." "Prince or no Prince," replied the judge, "you have no right to speak thus to the King's judge. I have sworn to do justice; and justice I shall do." The Prince, getting more enraged, then tried to set the prisoner free himself. But the judge told him it was none of his business, and ordered him to leave the court. The calmness with which the judge spoke made the Prince still more angry; and he rushed up to the bench, and struck the judge a severe blow on the face. For this, the judge ordered the officers of the court to seize the Prince and take him to prison with his friend. "I do this," he said, "not because he has done me harm, but because he has insulted the honour of the law."

GERMAN.

TUESDAY, SEPT. 15TH:—AFTERNOON, 2.30 TO 4.30.

1. Translate: —

Die zweite Prinzessin, als er die nämliche Frage an sie richtete, schnalzte mit der Zunge und sagte ärgerlich: "Lasst mich mit euren Albernheiten zufrieden!

Prinzessinnen, welche Pfeffernüsse backen können, giebt es nicht."

Am schlimmsten ging es aber dem König bei der dritten, obwohl sie die schönste und klügste war. Denn sie liess ihn gar nicht bis zu seiner Frage kommen, sondern, ehe er sie noch hatte thun können, fragte sie selbst, ob er wohl auch das Brummeisen zu spielen verstünde. Und als er dies verneinte, gab sie ihm einen Korb und meinte, es thue ihr herzlich leid. Er gefalle ihr sonst ganz gut; aber sie höre das Brummeisen für ihr Leben gern, und habe sich vorgenommen, keinen Mann zu nehmen, der es nicht spielen könne.

(Träumereien)

2. Give the 1st sing. of present and imperfect, and the past participle of *richten, lassen, gehen, fragen, tragen, verstehen, thun, gefallen, nehmen, reden, bitten, beten.*

3. What nouns form their plural by adding *er?* Decline in full:— *Kleiner Korb; sein Haus.*

4. Give the rules of the declension of proper names.

5. Give in full the present indicative of *können, mögen, dürfen*

6. Give the degrees of comparison of *süsz, stark, grosz, gut, viel, gern, klar, hoch.*

7. Decline in full *der* (rel. pron.).

8. What co-ordinating and what subordinating conjunctions are there in the passage of Question 1? When is the order of subject and verb inverted in German? Give illustrations from the same passage.

9. Translate:—

I was once young, but now I have grown old. What has become of his children? You may believe it. We are richest when we are most contented. We arrived on the 14th of October, at 3 o'clock in the afternoon. Carthage was destroyed by Scipio. Which is your friend? This is my friend. The pictures you have sent me are not those I wanted. He who lives virtuously is happy. The king is said to be ill. When I was travelling I saw two old lions and two young ones. He ought to have written this letter. He has been unable to come. If I had seen

him, I should have told him. How long have you been here? Take another glass of wine. When the soldiers had carried the officer out of the battle, they washed his wounds. I accept your offer with great pleasure. What business have you undertaken. Do you wish to sign this paper? You have been entirely mistaken.

ALGEBRA, PART I.

THURSDAY, SEPT. 10TH:—MORNING, 9 TO 11.

1. Find the value of

$$\frac{5(2x+3)}{11(6x^2+x-1)} + \frac{7x}{6x^2+7x-3} - \frac{12(3x+1)}{11(4x^2+8x+3)}$$

2. Solve the following equations

(a) $$\frac{x+3}{x+6} - \frac{x+6}{x+9} = \frac{x+2}{x+5} - \frac{x+5}{x+8}$$

(b) $$\frac{x}{2a} + \frac{y}{3b} = a+b$$

$$\frac{3x}{a} - \frac{2y}{b} = 6(b-a)$$

3. A train on the C. P. Railway passes from Montreal to Ottawa in 3 hours; a train on the Grand Trunk line which is 15 miles longer, travelling at a speed which is less by 1 mile per hour, passes from one place to the other in 3½ hours; find the length of each line.

4. Solve the following

(1) $$\frac{5}{x-2} - \frac{4}{x} = \frac{3}{x+3}$$

(2) $$3x^2 - 5y^2 = 28$$
$$3xy - 4y^2 = 8$$

(3) $$\sqrt{x} - \sqrt{x-8} = \frac{2}{\sqrt{x-8}}$$

5. Simplify

(a) $$\left\{ \sqrt[5]{\frac{a^{\frac{1}{2}} x^{-2}}{x^{\frac{1}{2}} a^{-2}}} \times \sqrt[3]{\frac{\sqrt{a\sqrt{x}}}{x^{-1}\sqrt{a}}} \right\}^{-4}$$

(*b*) $\sqrt{252} - \sqrt{294} - 48\sqrt{\frac{1}{6}}$

6. Two rectangles contain the same area, 480 yards. The difference of their length is 10 yards and of their breadth 4 yards: find their sides.

7. Find the square root of

$$9x - 12x^{\frac{3}{2}} + 10 - 4x^{-\frac{1}{2}} + x^{-1}.$$

GEOMETRY, PART I.

THURSDAY, SEPT. 10TH:—AFTERNOON, 2.30 TO 4.30.

1. To a given straight line apply a parallelogram which shall be equal to a given triangle, and have one of its angles equal to a given angle.

2. Divide a straight line so that the square on one part shall be double the square on the other.

3. If a straight line be divided equally and also unequally, the sum of the squares on the two unequal parts is twice the sum of the squares on half the line and on the line between the points of section.

4. Describe a square which shall be equal to a given rectilineal figure.

5. Three times the sum of the squares on the sides of a triangle is equal to four times the sum of the squares on the lines joining the vertices to the middle points of the opposite sides.

6. Equal chords in a circle are equidistant from the centre.

7. In any quadrilateral circumscribed about a circle, the sum of one pair of opposite sides is equal to the sum of the other pair.

8. If a straight line touch a circle, and from the point of contact a chord be drawn, the angles which this chord makes with the tangent shall be equal to the angles in the alternate segments of the circle.

9. Two straight lines *AB*, *CD* intersect in *E* so that the rectangle *AE*, *EB* is equal to the rectangle *CE*, *ED*; shew that the four points *A*, *B*, *C*, *D*, lie on a circle.

ALGEBRA, *Part II.*, AND GEOMETRY, *Part II.*

FRIDAY, SEPTEMBER 11TH:—AFTERNOON, 2.30 TO 4.30.

ALGEBRA.

1. If a, b, c, d are in continued proportion, prove that $b + c$ is a mean proportional between $a + b$ and $c + d$.

2. Between a and b there are to be inserted n arithmetical means. Prove that the first of these will be $\frac{an + b}{n + 1}$.

3. Show that 3600 words, each containing 3 consonants and 2 vowels, can be formed from 5 consonants and 3 vowels.

4. Show that

$$(a-2x)^{-\frac{3}{2}} = a^{-\frac{3}{2}}\left(1+\frac{3x}{a}+\frac{15x^2}{2a^2}+\ldots\right)$$

5. Prove that the logarithm of a fraction is equal to the logarithm of the numerator minus the logarithm of the denominator.

Given $\log 3 = .477$, find $\log (2.7)^3$.

6. Find the amount of an annuity left unpaid for a given number of years, allowing compound interest.

GEOMETRY.

1. About a given regular pentagon to describe a circle.

2. In a given circle to inscribe a regular polygon of thirty sides.

3. Prove that a parallelogram may be inscribed in any quadrilateral by joining the middle points of the sides.

4. Find a mean proportional between two given straight lines.

Are there any other mean proportionals in the figure?

5. Any rectilinear figure described on the hypotenuse of a right-angled triangle is equal to the sum of the similar and similarly described figures on the sides containing the right angle.

TRIGONOMETRY.

MONDAY, SEPTEMBER 14TH:—MORNING, 11 TO 12.30.

1. Express the angle of a regular pentagon in radians (circular measure).

2. Prove that $\cos(180° - A) = -\cos A$, first when A is a positive acute angle, and secondly, when A is a negative acute angle.

3. Find the values of (1) $\sin 150°$, (2) $\cos 225°$, (3) $\tan 330°$, (4) $\sec 480°$.

4. Solve the equation

$$\sec^2\theta + 2\tan\theta = 4,$$

for positive values of θ less than 180°. Draw the two angles obtained.

5. Show that

(1) $\dfrac{1+\cos A}{1-\cos A} - \dfrac{1-\cos A}{1\quad\cos A} = 4\cot A \operatorname{cosec} A,$

(2) $\cos(A - B) = \cos A\cos B + \sin A\sin B,$

(3) $\dfrac{\sin A + \sin B}{\cos A + \cos B} = \tan\dfrac{A+B}{2},$

(4) $\dfrac{\sin 2A}{1+\cos 2A} = \tan A.$

PHYSIOGRAPHY.

WEDNESDAY, SEPT. 9TH:—AFTERNOON, 4 TO 5.30.

1. Describe and account for the order of the Seasons in the North Temperate Zone.

2. What are the Monsoons, the Horse-Latitudes? Explain their occurrence.

3. Indicate the chief features of the water circulation in the North Atlantic.

4. Explain why a coast line sometimes consists of bold headlands and deep bays, and sometimes has extensive belts of low plains more or less parallel to the shore. Describe in detail some particular instance of each type.

5. Describe the Grand Canon of Colorado, and account for its formation.

6. Explain, giving an instance of each, the terms:—Mesa, Moraine, Atoll, Bore, Geyser.

7. What is a Folded Mountain Range? Describe some instance.

8. Describe and explain the differences of climate on the western and eastern sides of the mountain ranges along the Pacific Coast of North America. Does the same hold good for Central America?

9. Illustrate the effects of Climate on the habits, character and development of mankind.

BOTANY.

FRIDAY, SEPTEMBER 11TH:—AFTERNOON, 4.30 TO 6.

1. State what you know of the effects of fertilization upon an ovule.

2. Describe various kinds of metamorphosed leaves and stems, noting the function of each form.

3. Outline the life-history of a typical flowering plant.

4. Give an account of the different ways in which transpiration is regulated.

5. Describe those modifications of the flower which prevent self-fertilization, giving an example of each.

6. Tell what you know concerning the nutrition of plants, describing simple illustrative experiments.

7. Write an account of the respiration of plants, and describe an illustrative experiment.

8. Describe fully, giving the scientific names of the families, the genera and the species, two of the following plants:—

(*a*) The Apple.
(*b*) The Pine.
(*c*) The Dandelion.

CHEMISTRY.

TUESDAY, SEPTEMBER 15TH:—AFTERNOON, 4.30 TO 6.

1. What do you understand by neutralization? Illustrate by means of equations.

2. How is nitric acid prepared? What are its properties? Why is it called an oxidising agent?

3. Explain any four of the following terms:—element, symbol, formula, atomic weight, valence.

4. How does iodine occur in nature? State what you know with regard to its properties and uses.

5. State and explain the laws of combining proportion.

6. How many litres of carbon dioxide could you obtain by dissolving 520 grams of calcium carbonate in hydrochloric acid?

7. State what you know with regard to ozone and its properties.

8. In what respects do ordinary and red, or amorphous, phosphorus differ from one another?

9. What takes place when iron sulphide is treated with dilute sulphuric acid? Write the equation. What are the properties of the compounds produced?

PHYSICS.

THURSDAY, SEPT. 10TH:—AFTERNOON, 4.30 TO 6.

1. Explain the terms:—*liquid, gas, molecule.* State your idea of the condition of the molecules (1) in a liquid, (2) in a gas.

2. Describe the Aneroid Barometer.

3. Describe the Hydraulic Press. If the large piston has an area of 49 sq. in., what must be the area of the small one in order that a force of 12 lbs. may produce a pressure of 228 lbs.?

4. A solid weighs 10 gms. in air and 8 gms. in water. Find (*a*) the weight of an equal bulk of water, (*b*) the specific gravity of the solid, (*c*) its volume.

5. A mass of 4 lbs when acted on by a certain force travels 64 feet from rest in 8 seconds. What weight could the force support?

6. What is meant by the "centre of gravity" of a body? What is necessary in order that a body may rest in equilibrium when supported on a certain base? Explain how a bicycle rider recovers his balance by turning towards the side on which he is falling.

7. Convert 80°C to Fahrenheit. What would it correspond to on a thermometer whose freezing and boiling points were marked 10° and 110° respectively?

8. Explain:—
(*a*) the action of freezing mixtures.
(*b*) the formation of dew.
(*c*) how to make water boil at a low temperature.

SECOND YEAR EXHIBITIONS

SEPTEMBER, 1903.

FACULTY OF ARTS.

The papers follow the order of subjects as stated in the Calendar.

SECOND YEAR EXHIBITIONS.

GREEK AUTHORS.

WEDNESDAY, SEPTEMBER 16TH:—MORNING, 9 TO 12.

Translate, with notes on words and phrases underlined:—

A.—LUCIAN: CHARON AND SOMNIUM.

1. Καὶ πόσῳ δικαιότερον ἂν ἐμέ, ὦ Ἑρμῆ, ἐπαινοῖεν, ὃς αὐτόν σοι τὸν Μίλωνα μετ' ὀλίγον ξυλλαβὼν ἐνθήσομαι ἐς τὸ σκαφιδιον, ὁπόταν ἥκῃ πρὸς ἡμᾶς ὑπὸ τοῦ ἀναλωτοτάτου τῶν ἀνταγωνιστῶν καταπαλαισθεὶς τοῦ Θανάτου, μηδὲ ξυνεὶς ὅπως αὐτὸν ὑποσκελίζει; κἄτα οἰμώξεται ἡμῖν δηλαδὴ μεμνημένος τῶν στεφάνων τούτων καὶ τοῦ κρότου· νῦν δὲ μέγα φρονεῖ θαυμαζόμενος ἐπὶ τῇ τοῦ ταύρου φορᾷ. τί δ' οὖν οἰηθῶμεν; ἆρα ἐλπίζειν αὐτὸν καὶ τεθνήξεσθαί ποτε;

2. ἐθέλω δ' οὖν σοι, ὦ Ἑρμῆ, εἰπεῖν, ᾧτινι ἐοικέναι μοι ἔδοξαν οἱ ἄνθρωποι καὶ ὁ βίος ἅπας αὐτῶν. ἤδη ποτὲ πομφόλυγας ἐν ὕδατι ἐθεάσω ὑπὸ κρουνῷ τινι καταράττοντι ἀνισταμένας; τὰς φυσαλίδας λέγω, ἀφ' ὧν ξυναγείρεται ὁ ἀφρός· ἐκείνων τοίνυν αἱ μέν τινες μικραί εἰσι καὶ αὐτίκα ἐκραγεῖσαι ἀπέσβησαν, αἱ δ' ἐπὶ πλέον διαρκοῦσι καὶ προσχωρούσων αὐταῖς τῶν ἄλλων [αὗται] ὑπερφυσώμεναι ἐς μέγιστον ὄγκον αἴρονται, εἶτα μέντοι κἀκεῖναι πάντως ἐξερράγησάν ποτε· οὐ γὰρ οἷόν τε ἄλλως γενέσθαι. τοῦτό ἐστιν ὁ ἀνθρώπου βίος. ἅπαντες ὑπὸ πνεύματος ἐμπεφυσημένοι οἱ μὲν μείζους, οἱ δὲ ἐλάττους· καὶ οἱ μὲν ὀλιγοχρόνιον ἔχουσι καὶ ὠκύμορον τὸ φύσημα, οἱ δὲ ἅμα τῳ ξυστῆναι ἐπαύσαντο· πᾶσι δ' οὖν ἀπορραγῆναι ἀναγκαῖον.

3. δύο γυναῖκες λαβόμεναι τοῖν χεροῖν εἶλκύν με πρὸς ἑαυτήν ἑκατέρα μάλα βιαίως καὶ καρτερῶς· μικροῦ γοῦν με διεσπάσαντο πρὸς ἀλλήλας φιλοτιμούμεναι· καὶ γὰρ ἄρτι μὲν ἂν ἡ ἑτέρα ἐπεκράτει καὶ παρὰ μικρὸν ὅλον εἶχέ με, ἄρτι δ' ἂν αὖθις ὑπὸ τῆς ἑτέρας εἰχόμην. ἐβόων δὲ πρὸς ἀλλήλας ἑκατέρα, ἡ μέν. ὡς αὐτῆς ὄντα με κεκτῆσθαι βούλοιτο, ἡ δέ, ὡς μάτην τῶν ἀλλοτρίων ἀντιποιοῖτο. ἦν δὲ ἡ μὲν ἐργατικὴ καὶ ἀνδρικὴ καὶ αὐχμηρὰ τὴν κόμην, τὼ χεῖρε τύλων ἀνάπλεως, διεζωσμένη τὴν ἐσθῆτα, τιτάνου καταγέμουσα, οἷος ἦν ὁ θεῖος, ὁπότε ξέοι τοὺς λίθους· ἡ ἑτέρα δὲ μάλα εὐπρόσωπος καὶ τὸ σχῆμα εὐπρεπὴς καὶ κόσμιος τὴν ἀναβολήν.

B.—Euripides: Medea.

1. δεινὰ τυράννων λήματα, καί πως
ὀλίγ' ἀρχόμενοι, πολλὰ κρατοῦντες,
χαλεπῶς ὀργὰς μεταβάλλουσιν.
τὸ γὰρ εἰθίσθαι ζῆν ἐπ' ἴσοισιν
κρεῖσσον· ἔμοιγ' οὖν ἐπὶ μὴ μεγάλοις
ὀχυρῶς εἴη καταγηράσκειν.
τῶν γὰρ μετρίων πρῶτα μὲν εἰπεῖν
τοὔνομα νικᾷ, χρῆσθαί τε μακρῷ
λῷστα βροτοῖσιν· τὰ δ' ὑπερβάλλοντ'
οὐδένα καιρὸν δύναται θνητοῖς·
μείζους δ' ἄτας ὅταν ὀργισθῇ
δαίμων οἴκοις ἀπέδωκεν.

2. ΜΗ. ὦ χαῖρε καὶ σύ, παῖ σοφοῦ Πανδίονος,
Αἰγεῦ. πόθεν γῆς τῆσδ' ἐπιστρωφᾷ πέδον;
ΑΙ. Φοίβου παλαιὸν ἐκλιπών χρηστήριον.
ΜΗ. τί δ' ὀμφαλὸν γῆς θεσπιῳδὸν ἐστάλης;
ΑΙ. παίδων ἐρευνῶν σπέρμ' ὅπως γένοιτό μοι.
ΜΗ. πρὸς θεῶν, ἄπαις γὰρ δεῦρ' ἀεὶ τείνεις βίον;
ΑΙ. ἄπαιδές ἐσμεν δαίμονός τινος τύχῃ.
ΜΗ. δάμαρτος οὔσης, ἢ λέχους ἄπειρος ὤν;
ΑΙ. οὐκ ἐσμὲν εὐνῆς ἄζυγες γαμηλίου.

ΜΗ. τί δῆτα Φοῖβος εἶπέ σοι παίδων πέρι ;
ΑΙ. σοφώτερ' ἢ κατ' ἄνδρα συμβαλεῖν ἔπη.

3. ΜΗ. δράσω τάδ'· οὗτοι σοῖς ἀπιστήσω λόγοις·
γυνὴ δὲ θῆλυ, κἀπὶ δακρύοις ἔφυ.
ἀλλ' ὥνπερ οὕνεκ' εἰς ἐμοὺς ἥκεις λόγους,
τὰ μὲν λέλεκται, τῶν δ' ἐγὼ μνησθήσομαι.
ἐπεὶ τυράννοις γῆς μ' ἀποστεῖλαι δοκεῖ,
κἀμοί τἀδ' ἐστὶ λᾷστα, γιγνώσκω καλῶς,
μήτ' ἐμποδὼν σοί μήτε κοιράνοις χθονὸς
ναίειν, δοκῶ γὰρ δυσμενὴς εἶναι δόμοις,
ἡμεῖς μὲν ἐκ γῆς τῆσδ' ἀπαίρομεν φυγῇ,
παῖδες δ' ὅπως ἂν ἐκτραφῶσι σῇ χερὶ,
αἰτοῦ Κρέοντα τήνδε μὴ φεύγειν χθόνα.

C.—Demosthenes: Olynthiacs I. and II.

1. ἀλλὰ μὴν εἰ τοῦτο γενήσεται, δέδοικα, ὦ ἄνδρες Ἀθηναῖοι, μὴ τὸν αὐτὸν τρόπον ὥσπερ οἱ δανειζόμενοι ῥᾳδίως ἐπὶ τοῖς μεγάλοις τόκοις μικρὸν εὐπορήσαντες χρόνον ὕστεροι καὶ τῶν ἀρχαίων ἀπέστησαν, οὕτω καὶ ἡμεῖς ἐπὶ πολλῷ φανῶμεν ἐρρᾳθυμηκότες, καὶ ἅπαντα πρὸς ἡδονὴν ζητοῦντες πολλὰ καὶ χαλεπὰ ὧν οὐκ ἠβουλόμεθα ὕστερον εἰς ἀνάγκην ἔλθωμεν ποιεῖν, καὶ κινδυνεύσωμεν περὶ τῶν ἐν αὐτῇ τῇ χώρᾳ.

2. ὥσπερ οὖν διὰ τούτων ἦρθη μέγας, ἡνίκα ἕκαστοι συμφέρον αὐτὸν ἑαυτοῖς ᾤοντό τι πράξειν, οὕτως ὀφείλει διὰ τῶν αὐτῶν τούτων καὶ καθαιρεθῆναι πάλιν, ἐπειδὴ πάνθ' ἕνεκα ἑαυτοῦ ποιῶν ἐξελήλεγκται. καιροῦ μὲν δή, ὦ ἄνδρες Ἀθηναῖοι, πρὸς τοῦτο πάρεστι Φιλίππῳ τὰ πράγματα· ἢ παρελθών τις ἐμοί, μᾶλλον δὲ ὑμῖν δειξάτω ὡς οὐκ ἀληθῆ ταῦτ' ἐγὼ λέγω, ἢ ὡς οἱ τὰ πρῶτα ἐξηπατημένοι τὰ λοιπὰ πιστεύσουσιν, ἢ ὡς οἱ παρὰ τὴν αὐτῶν ἀξίαν δεδουλωμένοι Θετταλοὶ νῦν οὐκ ἂν ἐλεύθεροι γένοιντο ἄσμενοι.

3. ὥσπερ γὰρ ἐν τοῖς σώμασιν, ἕως μὲν ἂν ἐρρωμένος ᾖ τις, οὐδὲν ἐπαισθάνεται τῶν καθ' ἕκαστα σαθρῶν, ἐπὰν δ

ἀρρώστημά τι συμβῇ, πάντα κινεῖται, κἂν ῥῆγμα κἂν στρέμμα κἂν ἄλλο τι τῶν ὑπαρχόντων σαθρὸν ᾖ, οὕτω καὶ τῶν πόλεων καὶ τῶν τυράννων, ἕως μὲν ἂν ἔξω πολεμῶσιν, ἀφανῆ τὰ κακὰ τοῖς πολλοῖς ἐστιν, ἐπειδὰν δὲ ὅμορος πόλεμος συμπλακῇ, πάντα ἐποίησεν ἔκδηλα.

Translation at Sight.

Translate into English:—

θαυμάζω δ' ἔγωγε, εἰ μηδεὶς ὑμῶν μήτ' ἐνθυμεῖται μήτε λογίζεται, ὁρῶν, ὦ ἄνδρες Ἀθηναῖοι, τὴν μὲν ἀρχὴν τοῦ πολέμου γεγενημένην περὶ τοῦ τιμωρήσασθαι Φίλιππον, τὴν δὲ τελευτὴν οὖσαν ἤδη ὑπὲρ τοῦ μὴ παθεῖν κακῶς ὑπὸ Φιλίππου. ἀλλὰ μὴν ὅτι γ' οὐ στήσεται, δῆλον, εἰ μήτις κωλύσει. εἶτα τοῦτ' ἀναμενοῦμεν, καὶ τριήρεις κενὰς καὶ τὰς παρὰ τοῦ δεῖνος ἐλπίδας ἂν ἀποστείλητε, πάντ' ἔχειν οἴεσθε καλῶς; οὐκ ἐμβησόμεθα; οὐκ ἔξιμεν αὐτοὶ μέρει γέ τινι στρατιωτῶν οἰκείων νῦν, εἰ καὶ μὴ πρότερον; οὐκ ἐπὶ τὴν ἐκείνου πλευσόμεθα; ποῖ οὖν προσορμιούμεθα; ἤρετό τις· εὑρήσει τὰ σαθρά, ὦ ἄνδρες Ἀθηναῖοι, τῶν ἐκείνου πραγμάτων αὐτὸς ὁ πόλεμος, ἂν ἐπιχειρῶμεν· ἂν μέντοι καθώμεθα οἴκοι, λοιδορουμένων ἀκούοντες καὶ αἰτιωμένων ἀλλήλους τῶν λεγόντων, οὐδεποτ' οὐδὲν ἡμῖν μὴ γένηται τῶν δεόντων.

GREEK COMPOSITION, GRAMMAR AND HISTORY.

Wednesday, Sept. 16th:—Afternoon, 2.30 to 5.30.

A.

Translate into Greek:—

I will not dwell upon the formidable power of the Emperor by way of urging you to do your duty. That

would be too much compliment to him and too much disparagement to you. I should, indeed, myself have thought him truly formidable if he had achieved his present eminence by means consistent with justice. But he has risen to greatness partly through negligence and folly on your side, partly by treachery on his, by taking into his pay corrupt partisans among ourselves, and by cheating successively all his own allies. These allies have now found him out. The ministers of his aggrandisement will be the means of his downfall. His empire rests on rotten foundations; at a touch it will crumble away.

B.

1. Inflect the future optative active of *νέμω*, te first aorist imperative passive of *τίθημι*. the perfect indicative active of *θνήσκω*. the perfect indicative passive of *τάσσω* and *ὀρύσσω* the perfect optative passive of *μιμνήσκω*.

2. Give the various ways of expressing a wish in Greek.

3. Explain the use of *οὐ μὴ* with the future indicative and with the subjunctive.

C.

1. Describe the founding of a Greek colony. In what relation did the colony stand to the mother-city? Give a list of the Greek Colonies in Sicily, dividing then according to race.

2. Give some account of the reforms of Solon.

3. Show how the Confederacy of Delos originated, and indicate the steps by which it passed into an Athenian empire.

4. Write short notes on the following names: Hippias, Histiaeus, Phalaris, Pausanias, Artemisia, Aristides.

LATIN BOOKS AND UNSEEN.

WEDNESDAY, SEPT. 9TH:—MORNING, 9 TO 12.

(N.B.—*Question 5 is not to be attempted till the candidate has done what he can of the rest of the paper.*)

1. Translate:—

Est enim sapientis iudicis cogitare tantum sibi a populo Romano esse permissum, quantum commissum sit et creditum et non solum sibi potestatem datam, verum etiam fidem habitam esse meminisse: posse quem oderit absolvere, quem non oderit condemnare et semper non quid ipse velit sed quid lex et religio cogat cogitare; animadvertere qua lege reus citetur, de quo reo cognoscat, quae res in quaestione versetur. Cum haec sunt videnda, tum vero illud est hominis magni, iudices, atque sapientis, cum illam iudicandi causa tabellam sumpserit, non se reputare solum esse neque sibi quodcunque concupierit licere, sed habere in consilio legem, religionem, aequitatem, fidem; libidinem autem, odium, invidiam, metum, cupiditatesque omnes amovere maximique aestimare conscientiam mentis suae, quam ab dis immortalibus accepimus, quae a nobis divelli non potest: quae si optimorum consiliorum atque factorum testis in omni vita nobis erit, sine ullo metu et summa cum honestate vivemus.

2. Explain very briefly the allusion in the following:

(*a*) Longe sonantem natus ad Aufidum.

(*b*) Stesichoriique graves Camenae.

(*c*) Quas aut Parrhasius protulit aut Scopas.

(*d*) Levis Agyieu.

(*e*) Testis Metaurum flumen. (Can you quote the whole of the stanza in which this occurs?)

(*f*) Quae Tibur aquae fertile praefluunt.

(*g*) Ityn flebiliter gemens.

3. Complete the stanza commencing "verum pone moras." To whom is this addressed?

4. Translate:—

Manent ingenia senibus, modo permaneat studium et industria, nec ea solum in claris et honoratis viris, sed in vita etiam privata et quieta. Sophocles ad summam senectutem tragoedias fecit, quod propter

studium cum rem negligere familiarem videretur, a filiis in iudicium vocatus est, ut, quem ad modum nostro more male rem gerentibus patribus bonis interdici solet, sic illum quasi desipientem a re familiari removerent iudices. Tum senex dicitur eam fabulam, quam in manibus habebat et proxime scripserat, Oedipum Coloneum recitasse iudicibus quaesisseque num illud carmen desipientis videretur. Quo recitato sententiis iudicum est liberatus.

5. Translate:

(*a*) Conchyliatis Cn. Pompeii peristromatis servorum in cellis lectos stratos videres.

(*b*) Non enim iam inter latera nostra sica illa versabitur.

(*c*) Itaque alii cives Romani, ne cognoscerentur, capitibus obvolutis e carcere ad palum atque ad necem rapiebantur.

(*d*) Vidit Homerus probari fabulam non posse si cantiunculis tantus vir irretitus teneretur.

(*e*) Est mihi nonum superantis annum
plenus Albani cadus; est in horto
Phylli, nectendis apium coronis.

(*f*) Delectabatur crebro funali et tibicine.

(*g*) Semper enim boni adsiduique domini referta cella vinaria, olearia, etiam penaria est villaque tota locuples est, abundat porco, agno, gallina, lacte, caseo, melle.

6. For Unseen Translation.

(1) Dedemus ergo Hannibalem? dicet aliquis. Scio meam levem esse in eo auctoritatem propter paternas inimicitias: sed et Hamilcarem eo perisse laetatus sum, quod si ille viveret bellum iam haberemus cum Romanis et hunc iuvenem tanquam furiam facemque huius belli odi ac detestor; nec dedendum solum ad piaculum rupti foederis sed si nemo deposcat devehendum in ultimas maris terrarumque oras, ablegandum eo unde nec ad nos nomen famaque eius accidere neque ille sollicitare quietae civitatis statum possit.

(2) Sic prior Aeneas; sequitur sic deinde Latinus,
suspiciens caelum, tenditque ad sidera dextram;
'Haec eadem, Aenea, Terram, Mare, Sidera, iuro,
Latonaeque genus duplex, Ianumque bifrontem,
vimque deum infernam te duri sacraria Ditis:

audiat haec Genitor, qui foedera fulmine sancit;
tango aras, medios ignes et numina testor;
nulla dies pacem hanc Italis nec foedera rumpet,
quo res cumque cadent; nec me vis ulla volentem
avertet, non, si tellurem effundat in undas,
diluvio miscens, caelumque in Tartara solvat.

LATIN COMPOSITION, GRAMMAR AND HISTORY.

WEDNESDAY, SEPT. 9TH:—AFTERNOON, 2.30 TO 5.30.

A.—LATIN PROSE.

(*a*) For Latin Prose.

However, before these works were carried quite round, the townsmen sent deputies to Hannibal, to complain of his abandoning Capua and delivering it in a manner into the hands of the Romans; and to beseech him now at least, when they were not only invested but even pent up, to bring them relief. The consuls received a letter from Publius Cornelius the praetor to say that before they completed the circumvallation of Capua, they should give leave to such of the Campanians as chose it, to retire from the town and carry away their effects with them. That as many as withdrew before the Ides of March should enjoy their liberty and their property entire; but that both those who withdrew after that day, and those who remained in the place, should be treated as enemies.

(*b*) Sentences.

1. We asked them who they were, where they lived, where they came from, and where they were now going.

2. Ariovistus replied that he did not dare to come into those parts of Gaul which Caesar possessed.

3. He said that the king could easily be persuaded to set out at daybreak.

B.—LATIN GRAMMAR.

1. Write grammatical notes on the following sentences:—

(*a*) Ventum erat ad Vestae. Hor.

(*b*) Illa furia, qui non pluris fecerat. Cic.
(*c*) Triste lupus stabulis. Virg.
(*d*) Eri semper lenitas verebar quorsum evaderet. Ter.
(*e*) Carbonis eodem illo die mors. Cic.
(*f*) Quibus, Hector, ab oris exspectate venis? Virg.
(*g*) Maiores augebantur copiae. Bell. Hisp.
(*h*) Quid tibi huic receptio ad test meum virum? Plautus.
(*i*) Flagitium hominis. Plautus.
(*k*) Vir litterarum.
(*l*) Cunctas provinciarum. Pliny the Elder.
(*m*) Non habeo nauci Marsum augurem. Cic.
(*n*) It clamor caelo. Virg.
(*o*) Tota urbe trepidatum est.
(*p*) Die proximi. Claud Quad.
(*q*) Da mihi fallere. Horace.
(*r*) Minas quas mihi dare pollicitust. Ter.
(*s*) Vxor invicti Jovis esse nescis. Hor.
(*t*) Celeriter factost opus. Plautus.
(*u*) Lapides iaci coepti sunt. Caes.
(*x*) Expleri potestur. Sallust.
(*y*) Di duint tibi quaecunque optes. Plautus.
(*z*) Qui meus amor in te est, confecissem. Cic.

C.—Roman History.

(N.B.—*The answers should be brief.*)

1. Describe the constitution of the Roman Legion at the time of the 2nd Punic War.

2. Trace the progress of the 2nd Punic War from 218 to 216.

3. Describe briefly the course of political events during the tribuneship of Ti Gracchus.

4. Write a line or two on each of the following:—Scipio Nasica, Metellus Numidicus, Cn. Papirius Carbo, M. Livius Salinator, L. Anicius C. Flavius Fimbria, Glaucia, Massinissa, Scipio Africanus the Younger.

GEOMETRY.

THURSDAY, SEPT. 10TH:—AFTERNOON, 2.30 TO 4.30.

A.

1. Define *inverse* points, and prove that the inverse of a circle is either a line or a circle, according as the centre of inversion is on the circumference of the circle or not.

2. If four points be collinear their anharmonic ratio is equal to the anharmonic ratio of their four polars.

3. Given the base of a triangle, the perpendicular, and the sum of sides, construct it.

4. Prove that the straight lines joining the opposite angles of a hexagon described about a circle are concurrent.

5. Describe a circle passing through a given point and touching a given circle.

6. If through a fixed point two transversals be drawn intersecting two given straight lines, and if the points of section be joined transversed, find the locus of the point of intersection of the joining lines.

B.

7. Draw a common tangent to two given circles.

8. If two triangles upon the same base have the middle points of their sides joined, the figure formed by the joining lines shall be a parallelogram, equal in area to half the sum or half the difference of the triangles according as the triangles are on opposite sides or the same side of the base.

9. Given two intersecting straight lines AB, AC, and a point P between them; shew that of all straight lines which pass through P and are terminated by AB and AC, that which is bisected at P cuts off the minimum triangle.

10. Prove that the locus of the intersection of tangents drawn to a circle at the extremities of all chords passing through a given point within the circle is the polar of that given point.

11. If three concurrent straight lines are drawn from the angular points of a triangle to meet the opposite

sides, then the product of three alternate segments taken in order is equal to the product of the other three segments.

12. The six centres of similitude of three circles lie three by three on four straight lines.

MATHEMATICS.

THURSDAY, SEPT. 10TH:—MORNING, 9 TO 12.

GEOMETRY.

1. Triangles which have the same altitude are to one another as their bases.

2. In a triangle ABC the bisector of the vertical angle BAC meets the base at D and the circumference of the circumscribed circle at E. Shew that BA, AD, EA, AC, are four proportionals.

3. Similar triangles are to one another in the duplicate ratio of their homologous sides.

4. Describe a rectilineal figure which shall be equal to one and similar to another rectilineal figure.

ALGEBRA.

5. Simplify

$$\frac{ax^2+b}{2x-1}+\frac{2(bx+ax^2)}{1-4x^2}-\frac{ax^2-b}{2x+1}$$

6. Solve the equations

(a) $$\frac{x+3}{x+6}-\frac{x+6}{x+9}=\frac{x+2}{x+5}-\frac{x+5}{x+8}$$

(b) $$3x^2-y^2=23$$
$$2x^2-xy=12.$$

7. (a) Extract the square root of
$$9x-12x^{\frac{3}{2}}+10-4x^{-\frac{1}{2}}+x^{-1}$$

(b) Simplify and express with positive indices

$$\left\{\sqrt[3]{\frac{a^{\frac{1}{2}}x^{-2}}{x^{\frac{1}{2}}a^{-2}}}\times\sqrt[3]{\frac{a\sqrt{x}}{x^{-1}\sqrt{a}}}\right\}^{-4}$$

8. Two rectangles contain the same area, 480 sq. yds. The difference of their lengths is 10 yds. and of the breadths 4 yds. Find their sides.

TRIGONOMETRY.

9. In any triangle prove (*a*) $\cos A = \frac{b^2 + c^2 + a^2}{2bc}$

(*b*) $\cos \frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}$

10. In any triangle prove

(*a*) $\tan \frac{A-B}{2} = \frac{a-b}{a+b} \tan \frac{A+B}{2}$.

(*b*) $\frac{a+b}{c} = \frac{\cos \frac{A-B}{2}}{\cos \frac{A+B}{2}}$

11. The sides of a triangle are $a = 450$, $b = 470$, $c = 490$. Find A. B. C.

12. Derive and explain the formula

$$A = \frac{a}{r}$$

THEORY OF EQUATIONS—ALGEBRA.

TUESDAY, SEPT. 15TH:—MORNING, 9 TO 12.

A.

1. Solve the equation

$$x^3 + 3x = \frac{3}{2}$$

2. Find a superior limit to the positive roots of

$$x^5 + 3x^4 + x^3 - 8x^2 - 51x + 18 = 0$$

proving the method you employ.

3. Find the number and situation of the real roots of

$$x^3 - 7x + 7 = 0.$$

4. Find the equations whose roots are those of

$$x^5 + 4x^3 - x^2 + 11 = 0$$

each diminished by 3.

5. A multiple root of the order m of the equation $f(x) = 0$ is a multiple root of the order $m - 1$ of the first derived equation $f'(x) = 0$.

6. Apply Newton's method to calculate a root of the equation $x^3 + 3x - 5 = 0$.

B.

7. If an equation $f(x) = 0$, whose coefficients are all real quantities, have for a root the imaginary expression $\alpha+\beta\sqrt{-1}$, it must also have for a root the expression $\alpha-\beta\sqrt{-1}$.

8. Transform the equation $x^4 - 4x^3 - 18x^2 - 3x + 2 = 0$ into one wanting the third term.

9. Solve the equation

$$x^3 + qx + r = 0$$

10. The equation $2x^3 - 85x^2 - 85x - 87 = 0$ has a positive root between 40 and 50; find it.

11. Find the amount of an annuity left unpaid for a given number of years, allowing compound interest.

12. Resolve into partial fractions

$$\frac{42 - 19x}{(x^2+1)(x-4)}$$

ENGLISH.

TRENCH: *Study of Words.*

TUESDAY, SEPT. 15TH:—AFTERNOON, 4.30 TO 6.

1. Write on the following words: Irenæus, Port Natal, Gaza, Labarum, Hapsburg, Althorp.

2. Give the etymology of *tinsel, tawdry, idiot,* and show that those words have deteriorated in meaning. Show that *angel, martyr, paradise, marshal* have become ennobled in meaning, and give the etymology of any two of them.

3. (*a*) In what way is reference made, under "poverty of language," to "Him that is above" and to our word "thanks?"

(*b*) How is the poetry in words illustrated by terms applied to waves? Who use them?

(*c*) Give the etymology of *caprice* and deduce the meaning of the word from it.

(*d*) Illustrate the history in words from *algebra, archimandrite.*

4. What is said regarding the etymology of *peacock, pavo, Drepanum, Morea, girl, apis?*

5. Write without any comment, two words illustrating each of the following heads:

(*a*) Fair words for ugly things.

(*b*) The Norman was the ruling race.

(*c*) Characters in books as the source of words.

(*d*) French vocabulary dating from the reign of Louis XIV.

(*e*) The coining of comic terms in Latin.

6. (*a*) What do *miscreant* and *Saviour* illustrate? Give details.

(*b*) How are the following statements supported?

Man had from the beginning *the power of naming*.

The protest of the Quakers against the use of the the names commonly given to the days of the week was absurd.

(One argument is sufficient.)

A very notable fact about new words is the difficulty which is so often found in tracing their pedigree.

(Two examples are sufficient.)

(*c*) State any three causes of synonyms. Illustrate two of them.

ENGLISH.

A.—TENNYSON: *Selections.*

FRIDAY, SEPT. 11TH:—MORNING, 9 TO 12.

1. Give the connection, and explain the following:

(*a*) "My youth," she said, "was blasted with a curse:
This woman was the cause."

(*b*) Ere I saw her, who clasp'd in her last trance
Her murder'd father's head.

(*c*) Shot like a streamer of the Northern Morn,
Seen where the moving isles of winter shock
By night, with noises of the Northern sea.

(*d*) A white-hair'd shadow, roaming like a dream
The ever-silent spaces of the East.

(*e*) Such times have not been since the light that led
The holy Elders with the gift of Myrrh.

(*f*) The Abominable, that uninvited came
Into the fair Peleian banquet hall,
And cast the golden fruit upon the board.

(*g*) Sore task to hearts worn out by many wars
And eyes grown dim with gazing on the pilot-stars.

2. Write briefly on (*a*) Tennyson's Classicism; (*b*) his use of similes; (*c*) his metres.

3. What can you say of Tennyson's portraits of women? Illustrate by quotation.

B.—SPENSER: *Faerie Queene, Bk. I.*

1. Explain Spenser's scheme for the *Faerie Queene*. How far did he succeed in carrying it out?

2. Give instances from Book I. (*a*) of archaic diction; (*b*) of the luxuriance and melody of Spenser's verse.

3. Set forth Spenser's conception of the character of Una with special reference to its spiritual significance.

4. Explain the historical allegory of Book I., giving as full particulars as you can of persons and incidents.

C.—ENGLISH COMPOSITION.

Write an essay of not less than three pages on any *one* of the following subjects:

Spenser's Puritanism.
The Ideal of Sir Galahad.
King Arthur.

HISTORY.

CHURCH: *The Beginning of the Middle Ages.*

TUESDAY, SEPT. 15TH:—AFTERNOON, 2.30 TO 4.30.

1. Write a detailed account of Teutonic settlements in the western part of the Roman Empire.

2. By what influences were the Teutonic settlers chiefly affected? Answer this question at length and with illustrations.

3. Notice briefly:

(*a*) The Eastern Emperors from Justinian to the Macedonian dynasty;

(*b*) The Greek Church;

(*c*) The contest of Constantinople with the Mohammedans.

4. Discuss the consolidation and unity of the English people.

5. What main results followed from the breaking up of the Frankish Empire?

6. Make brief notes on:

Alaric and Stilicho; the battle of Testry; the deposition of Childeric III.; Charlemagne and the Saxons; the Lügenfeld.

FRENCH.

MONDAY, SEPT. 14TH:—MORNING, 9 TO 12.

I. Traduire en français:

(*a*) An old Frenchman asked an Englishman, "Sir, if you were not an Englishman, to what country would you choose to belong?" The Englishman, wishing to be polite, replied, "If I were not an Englishman, I should like to be a Frenchman;" whereupon the old gentleman retorted, "But I, sir, if I were not a Frenchman, I would like to become a Frenchman." He was very Chauvinist, this old man; he liked to quote the old French saying that a Frenchman understands before one speaks, an Italian while one is speaking, an Englishman after one has spoken.

(*b*) He sends fifty boys every year to Canada, and is thus helping to solve the great difficulty of providing for (*pourvoir à*) the future of the enormous poor population of the east of London. Instead of being hereafter a source of weakness and danger by becoming beggars, or even criminals, in London, these boys will become healthy, strong men, and good citizens, the firm friends of England in the New World. He has succeeded in enlisting in his enterprise several friends of the same stamp (*trempe*, f.) as himself, who are helping him in every kind of work in the interest of the honest poor. At first people spoke with pity of "these young fanatics," but it was vain for people to prophesy failure.

II. EUGENIE GRANDET:

Le caractère de Grandet *ou* de Charles.

La concurrence entre les des Grassins et les Cruchot pour la main d'Eugénie.

JACK:

La première année que Jack passa à Indret.

ou

Le caractère de Labassindre.

PAGES CHOISIES DE MICHELET:

Faire une analyse des chapitres sur *la Mer* ou sur *les Femmes de la Révolution.*

GERMAN.

MONDAY, SEPT. 14TH:—AFTERNOON, 2.30 TO 5.30.

I. Translate into English:—

(*a*) Nicht Worte sind's, die diesen traur'gen Streit
Erledigen. Hier ist das Mein und Dein,
Die Rache von der Schuld nicht mehr zu sondern.
Wer möchte noch das alte Bette finden
Des Schwefelstroms, der glühend sich ergosz?
Des unterird'schen Feuers schreckliche
Geburt ist alles, eine Lavarinde
Liegt aufgeschichtet über dem Gesunden,
Und jeder Fusztritt wandelt auf Zerstörung.

(*b*) So nahe glaubt' ich mich dem sichern Hafen,
So fest vertraut' ich auf des Glückes Pfand,
Und alle Stürme glaubt 'ich eingeschlafen,
Und freudig winkend sah ich schon das Land
Im Abendglanz der Sonne sich erhellen;
Da kommt ein Sturm, aus heitrer Luft gesandt,
Und reiszt mich wieder in den Kampf der Wellen.

(*c*) Er betrachtet die Frauen wie untergeordnete Wesen, etwa wie seine Schüler,—vermutlich stehen in einem dieser alten Bücher solche verwünschte Grundsätze. Er weist mich in di echlechtesten Zimmer seiner Wohnung, die kaum mit dem Not dürftigsten ausgestattet sind, er will von den Gewohnheiten seines Hagestolzenlebens nicht abgehen und stellt diese als Richtschnur für unser eheliches Leben auf—kann sich dabei eine wirkliche Ehe gestalten?

(*d*) Er hatte sich einen ritterlichen Krieg geträumt, wo er sich mit dem Mute seines Ehrgeizes und dem Glanz seiner Erscheinung

rasch zum Ritter wollte emporkämpfen, und man führte ihn zum Raufen, Rauben und Mordbrennen, zum Leuteschinden und eLandverwüsten. In der Schlacht vielleicht der erste, war r in jenen Heldenthaten doch allezeit der letzte unter seinen Kameraden, und obgleich er, nach damaliger Art, seine Haut zum öftern einem anderen Kriegsherrn verkaufte, kam er dennoch nie in eine ordentliche Schlacht.

II. Translate into English (at sight):—

Seit wir in die heiße Zone eingetreten waren, konnten wir jede Nacht die Schönheit des südlichen Himmels nicht genugsam bewundern, welcher in dem Maaß, als wir nach Süden vorrückten, neue Sternbilder unsern Augen entfaltete. Man hat ein wunderbar bekanntes Gefühl, wenn man bei der Annäherung gegen den Aequator und besonders, wenn man von der einen Hemisphäre in die andere übergeht, allmählich die Sterne niederer werden und zuletzt verschwinden sieht, welche man von seiner ersten Kindheit an kennt. Nichts erinnert einen Reisenden lebhafter an die unermeßliche Entfernung seines Vaterlandes als der Anblick eines neuen Himmels. Die Gruppirung der großen Sterne, eine ige zerstreute Nebelsterne,, welche an Glanz mit der Milchstraßwetteifern, und Räume, welche durch eine außerordentliche Schwärze ausgezeichnet sind, geben dem südlichen Himmel eine eigenthümliche Physiognomie. Dieses Schauspiel setzt selbst die Einbildungskraft derjenigen in Bewegung, welche, ohne Unterricht in den höhern Wissenschaften, das Himmelsgewölbe gern betrachten, wie man eine schöne Landschaft oder eine majestätische Aussicht bewundert.

III. Translate into German (at sight):—

A lady had a little daughter about five years old, who loved her mother and grandmother equally well. On the birthday of the latter, the mother asked her little daughter Emma (that was her name) to pray to God that he would bless her grandmother, and that she might become very old. Her grandmother was quite old already, and the little girl knew enough to see it. She, therefore, looked at her mother with surprise at this request. The mother noticed the look

of her child, and asked again: "Well will you not pray to God that your grandmother may become older?" The little girl answered with childlike simplicity: "Dear mother, grandma is already very old, I would rather pray to God that she may become young again."

IV. Discuss *Der Neffe als Onkel* either as a translation or as a play of the *Menaechmi* type.

V. Describe the transition period in the life of Schiller or Goethe, indicating also the means and methods by which the second poetic personality disengaged itself from the earlier.

VI. Write on the syntax of the definite article.

THIRD YEAR SCHOLARSHIPS

FACULTY OF ARTS.

SEPTEMBER, 1903.

The papers follow the order of subjects as stated in the Calendar.

THIRD YEAR SCHOLARSHIPS.

ANALYTIC GEOMETRY—(*First Paper*).

WEDNESDAY, SEPT. 9TH:—MORNING, 9 TO 12.

A.

1. Find the locus of the middle points of chords, parallel to a given line, of a curve of the second degree.

2. The polar of any point with regard to a conic is parallel to the ordinates of the diameter passing through the point.

3. If a be the angle made with the axes of x by the perpendicular (length $= p$) from the centre of an ellipse on a tangent prove that

$$p^2 = a^2 \cos^2 a + b^2 \sin^2 a$$

4. Prove that a line drawn from the centre of an ellipse parallel to a focal radius vector to a point, and terminated by the tangent at the point is equal to the semi-axis major.

5. Find by the method of infinitesimals the area of an ellipse.

6. Prove by the method of infinitesimals that the tangent at any point of an ellipse makes equal angles with the focal radii vectores to the point.

B.

7. Given the vertical angle and the sum of the sides of a triangle, find the locus of the point where the base is cut in a given ratio.

8. Prove that the three perpendiculars of a triangle all meet in a point.

9. Find the equation of the tangent at the point $x^1\ y^1$ to the curve $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$.

10. Given the vertex and vertical angle of a triangle and the rectangle under the sides; if one extremity of the base describe a right line or a circle, find the locus described by the other extremity.

11. Given any two points A and B, and their polars with respect to a circle whose centre is O; let fall a perpendicular AP from A on the polar of B, and a perpendicular BQ from B on the polar of A, then

$$\frac{OA}{AP} = \frac{OB}{BQ}$$

11. In an ellipse the sum of two focal chords drawn parallel to two conjugate diameters is constant.

ANALYTIC GEOMETRY—(*Second Paper*).

THURSDAY, SEPT. 10TH:—MORNING, 9 TO 12.

1. If $S = 0$ and $S^1 = 0$ represent two conics, prove that there are three values of K for which $S - K S^1 = 0$ represents a pair of right lines. What relation do these lines bear to the given conics?

2. Form the equation of the conic passing through the points (1, 2), (3, 5), (—1, 4), (—3, —1), (—4, 3).

3. Show that

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1 = \left(\frac{xx^1}{a^2} + \frac{yy^1}{b^2} - 1\right)\left(lx + my - lx^1 - my\right)$$

is the most general equation of a conic osculating at the point $x\ y^1$ the conic $\frac{x^2}{a^2} + \frac{y_2}{b^2} = 1$; and find the values of l and m so the osculating conic be a circle.

4. Prove that

$$l^2 a^2 + m^2 \beta^2 = n^2 \gamma^2$$

denotes a conic with respect to which $= 0$, $\beta a = 0$, $\gamma = 0$ are the sides of a self-conjugate triangle.

5. Show that the focus of any conic may be regarded as an infinitely small circle, touching the conic in two imaginary points situated on the directrix.

6. The locus of a point, the sum or difference of whose tangents to two given circles is constant, is a conic having double contact with the two circles.

7. Prove that at any point in the parabola the focal chord of curvature is equal to the parameter of the diameter passing.

8. Find the locus of the foot of the perpendicular from the focus of the parabola on the normal at any point.

9. Find the locus of the intersection of normals at the extremities of a focal chord of a conic.

10. Find the locus of the perpendicular from the focus on any tangent to a central conic, with the radius vector from the centre to the point of contact.

11. Two vertices of a triangle move along fixed right lines; find the locus of the third.

12. Find the condition that two conic sections, given by the general equations, should be similar, even though not similarly placed.

CALCULUS.

MONDAY, SEPT. 14TH:—MORNING, 9 TO 12.

A.

1. If two curves whose equations are $u = o$ and $u^1 = o$ intersect at right angles at a point x, y, prove that

$$\frac{du}{dx}\cdot\frac{du'}{dx} + \frac{du}{dy}\cdot\frac{du'}{dy} = 0$$

(*a*) Find the condition that the curves

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 : \quad \frac{x^2}{a'^2} + \frac{y^2}{b'^2} = 1$$

should intersect at right angles.

2. Find an expression for the radius of curvature in polar co-ordinates.

3. Define the evolute of a curve and prove that the length of any arc of the evolute is equal, in general, to the difference between the radii of curvature at its extremities.

4. In polar co-ordinates prove that the perpendicular on the tangent is given by the equation

$$\frac{1}{p^2} = u^2 + \left(\frac{du}{d\theta}\right)^2$$

(*a*) Hence shew that $\frac{(d^2u)}{d\theta^2} + u = \frac{1}{p^2u^2}\frac{dp}{dr}$

5. Given the angle C of a triangle, prove that

$\sin^2 A + \sin^2 B$ is a maximum; and $\cos^2 A + \cos^2 B$ is a minimum; when $A = B$.

6. Given $z = a + b\,x^n$, find the expansion of z by Lagrange's theorem.

B.

7. Integrate $\int \frac{1-x^2}{1+x^2} \frac{dx}{\sqrt{1+x^4}}$; $\int dx \sqrt{2+\sqrt{2+x^2}}$

8. Integrate

$$\int \mathrm{Sin}^3\theta\, \mathrm{Cos}^7\theta\, d\theta\,;\ \int x^3 \cos x\, dx\,;\ \int \epsilon^{-x}\cos^2 x\, dx$$

9. Integrate

$$\int \frac{dx}{(1+x^2)(1-x^2)^{\frac{1}{2}}}\,;\ \int \frac{dx}{(1+x^2)\tan^{-1}x}\,;\ \int \frac{(3x^2-2)dx}{x^4-3x^2-4}$$

10. Shew that

$$\int_0^{\frac{\pi}{4}} \frac{\mathrm{Sin}\theta\, d\theta}{\cos\theta} = \sqrt{2} - 1;\ (2) \int_0^{\infty} \epsilon^{-ax} \sin mx\ dx = \frac{m}{a^2+m^2}$$

$$(3) \int_0^{\frac{\pi}{2}} \frac{d\theta}{5+4\sin\theta} = \frac{2}{3}\left(\tan^{-1}\frac{1}{3}\right)$$

11. Shew that the whole area of the curve $a^2 y^2 = x^3(2a - x)$ is πa^2.

12. Shew that the length of an elliptic arc is represented by

$$\int \sqrt{\frac{a^2-e^2x^2}{a^2-x^2}}\, dx, \text{ where } a \text{ is}$$

the semi-axis major and e the eccentricity.

ALGEBRA—THEORY OF EQUATIONS. TRIGONOMETRY.

A.

1. Prove that the square of a determinant is a symmetrical determinant.

2. Calculate the value of the determinant.

$$\begin{vmatrix} 67, & 19, & 21 \\ 39, & 13, & 14 \\ 81, & 24, & 26 \end{vmatrix}$$

by transformation into determinant with lower numbers.

3. Define the reciprocal of a given determinant, and express the first minors of the reciprocals in terms of the original co-efficients.

4. Find the positive root of the equation

$$4x^3 - 13x^2 - 31x - 275 = 0.$$

5. Solve the equation $x^5 - 1 = 0$.

6. Find by Newton's method an approximate value of the positive root of the equation $x^3 - 2x - 5 = 0$.

7. Prove

(*a*) $\text{Sin } n\theta = n \cos \theta \sin\theta - \frac{n(n-1)(n-2)}{\lfloor 3} \cos^{n-3}\theta \sin^3\theta + \text{etc}$

(*b*) $(2\cos\theta)^n = 2\cos n\theta + n \cdot 2\cos(n-2)\theta + \frac{n(n-1)}{\lfloor 2} \cdot 2\cos(n-4)\theta + \text{etc.}$

8. Prove (*a*) $\cos\theta = 1 - \frac{\theta^2}{\lfloor 2} + \frac{\theta^4}{\lfloor 4} + \text{etc}$

(*b*) $\text{Sin}\,\theta = \theta - \frac{\theta^3}{\lfloor 3} + \frac{\theta^5}{\lfloor 5}$

9. Resolve into factors

$$x^{2n} - 2x^n \cos n\theta + 1.$$

10. In a spherical triangle prove

(*a*) $\tan\frac{A+B}{2} = \frac{\cos\frac{a-b}{2}}{\cos\frac{a+b}{2}} \text{Cot}\frac{C}{2}$

(*b*) $\tan\frac{a+b}{2} = \frac{\cos\frac{A-B}{2}}{\cos\frac{A+B}{2}} \tan\frac{c}{2}$

11. In a spherical triangle, given $A = 64°.\ 24'.\ B = 42°.\ 30'.\ C = 58°\ 40'$, find A and B

12. Express the area of a spherical triangle in terms of its angles.

LOGIC.

FRIDAY, SEPT. 11TH:—MORNING, 9 TO 12.

(*Answer questions 8 and 9 and any other six.*)

1. Explain the significance of Definition for Science, and the relation of the doctrine of Definition to that of the Predicables.

2. What do you understand by Inference? Give some account of the main forms.

3. To what fallacies of argument is ordinary thought most liable? Give some account of them with illustrations.

4. "It is not difficult to see that the *a priori* method is equivalent to the synthetic method considered in intension, the *a posteriori* method of course being equivalent to the analytic method. But the same difference is expressed by deductive and inductive." Explain and discuss, with examples other than those employed by Jevons.

5. Comment on the following, with some illustration;

(*a*) Symbolical and Intuitive Knowledge (Leibnitz).

(*b*) Method of concomitant variations.

(*c*) Use of Analogy in Scientific investigation and proof.

(*d*) Perfect Induction.

6. (*a*) Which of the Figures of the Syllogism are most useful and why?

(*b*) Show that Cesare, Disamis, Camestres can be proved per impossibile.

7. Show the importance of classification for knowledge, and explain the principles of a good classification.

8. (*a*) What is the difference between the causal and casual happening of events, if, as is generally postulated, not even a dead leaf falls to the ground without sufficient causes to determine the precise moment of its falling, and the precise spot upon which it falls?

(*b*) "Brewster accidentally took an impression from a piece of Mother-of-pearl in a cement of resin and beeswax, and finding the colours repeated upon the surface of the wax, proceeded to take other im-

pressions in balsam, lead, gum-arabic, etc., and always found the irridescent colours the same. He thus proved that the chemical nature is wholly a matter of indifference, and the form of the surface is the condition of such colours." What method was employed?

9. Analyse, and test the reasoning of the following examples:

(*a*) Matter in thin films or in fine streams does not behave like matter in bulk; new properties are observed, which are not to be accounted for by the reduction of the old properties, in proportion to the scale of reduction. If the structure is atomic, we can imagine how these new properties will come in when the films, or streams, are but a few atoms thick. If matter is continuous, we have, as yet, no kind of explanation of such properties.

Prof. J. A. Poynting

(*b*) Dr. Wallace's argument (to prove that the Earth is the only planet in the whole Universe on which humanity has been developed) stands thus:

Life is impossible at the uttermost boundaries of the Universe—

Therefore, it is only possible at the exact centre.

Prof. H. H. Turner.

(*c*) The more correct the Logic, the more certainly the conclusion will be wrong if the premises are false; therefore, where the premises are wholly uncertain the best logician will be the least safe guide.

PLANT BIOLOGY.

FRIDAY, SEPT. 11TH:—AFTERNOON, 2.30 TO 5.30.

1. Discuss as fully as you can, Homologous and Antithetic Alternation of Generations, and show which accords more closely with observed facts, and serves

to explain more clearly the various phases in progressive development.

2. Discuss the influence of light in determining the position of organs.

3. Discuss the so-called "reversions" in flowers, and interpret them in the light of Bower's theory of the origin of the sporophyte, comparing with Goethe's theory of Metamorphosis.

4. Discuss "Arrest" in the development of organs as to kind and mode of development, and interpret such phenomena in relation to the general course of evolution.

5. Discuss the division of labour in plants through the formation of organs, comparing, in this respect, Coenobia and Cell Dominions.

6. Discuss the special influence of the medium (environment) upon the modification of form and structure.

ANIMAL BIOLOGY.

HUXLEY'S LESSONS IN ELEMENTARY PHYSIOLOGY.

THURSDAY, SEPT. 10TH:—MORNING, 9 TO 12.

1. Explain with diagrams the structure of the human heart, and explain also the method of its action and the general course of the circulation.

Account for the sounds made by the heart, and explain the relation between the beat of the heart and the pulse. Why is there no pulse in the veins?

2. Describe the structure of the human kidney and the ducts which lead from it, pointing out the function of each part in detail.

3. Draw a diagram of the bones of the arm and hand, and explain the various movements of which they are capable.

4. Describe the structure of the larynx—giving the cartilages and muscles—and explain how the various notes are made in singing.

5. Describe the structure and the functions of the ear, following the sound from its entrance into the

internal ear till the production of the sensation of hearing.

6. Briefly describe the brain, making use of diagrams, and say what you know of the functions of the various parts.

What are the functions of the sympathetic system?

ANIMAL BIOLOGY.

VERWORN'S GENERAL PHYSIOLOGY.

TUESDAY, SEPT. 15TH:—AFTERNOON, 2.30 TO 5.30.

1. Give an outline of Verworn's proof that the cell is the final unit of living matter. Can you suggest any criticism of this view?

2. Give Verworn's argument in favour of the liquid character of living substance.

3. Describe the structure of cross-striated muscle, and explain how its changes on contraction may be made to harmonize with the phenomena of the contraction of Amoeba.

4. Describe experiments to show what is the essential chemical compound in living matter. What is Verworn's theory as to the function of carbohydrate?

5. Define a stimulus.

Briefly discuss the stimulating effects of cold, heat and pressure.

6. Describe Verworn's theory of the mechanism by which animals are directed to and from various substances.

Give in detail his analysis of the mechanism of the motion of Amoeba.

GREEK AUTHORS.

WEDNESDAY, SEPT. 16TH:—MORNING, 9 TO 12.

Translate, with notes on words and phrases underlined: —

A.—SOPHOCLES, ANTIGONE.

(1) οὐκ ἔστιν. ἀλλὰ ταῦτα καὶ πάλαι πόλεως
ἄνδρες μόλις φέροντες ἐρρόθουν ἐμοί,
κρυφῇ κάρα σείοντες, οὐδ' ὑπὸ ζυγᾷ
λόφον δικαίως εἶχον, ὡς στέργειν ἐμέ.
ἐκ τῶνδε τούτους ἐξεπίσταμαι καλῶς
παρηγμένους μισθοῖσιν εἰργάσθαι τάδε.
οὐδὲν γὰρ ἀνθρώποισιν οἷον ἄργυρος
κακὸν νομισμ' ἔβλαστε· τοῦτο καὶ πόλεις
πορθεῖ, τόδ' ἄνδρας ἐξανίστησιν δόμων·
τόδ' ἐκδιδάσκει καὶ παραλλάσσει φρένας
χρηστὰς πρὸς αἰσχρὰ πράγματ' ἵστασθαι βροτῶν,
πανουργίας δ' ἔδειξεν ἀνθρώποις ἔχειν
καὶ παντὸς ἔργου δυσσέβειαν εἰδέναι.

(2) καὶ φθέγμα καὶ ἀνεμόεν
φρόνημα καὶ ἀστυνόμους ὀργὰς ἐδιδάξατο,
καὶ δυσαύλων
πάγων ἐναίθρεια καὶ δύσομβρα φεύγειν βελη,
παντοπόρος· ἄπορος ἐπ' οὐδὲν ἔρχεται
τὸ μέλλον· Ἅιδα μόνου φεῦξιν οὐκ ἐπάξεται·
νόσων δ' ἀμηχάνων φυγὰς ξυμπέφρασται.

(3) ὅστις δ' ὑπερβὰς ἢ νόμους βιάζεται,
ἢ τοὐπιτάσσειν τοῖς κρατύνουσιν νοεῖ,
οὐκ ἔστ' ἐπαίνου τοῦτον ἐξ ἐμοῦ τυχεῖν,
ἀλλ' ὃν πόλις στήσειε, τοῦδε χρὴ κλύειν
καὶ σμικρὰ καὶ δίκαια καὶ τἀναντία·
καὶ τοῦτον ἂν τὸν ἄνδρα θαρσοίην ἐγὼ
καλῶς μὲν ἄρχειν, εὖ δ' ἂν ἄρχεσθαι θελειν,
δορός τ' ἂν ἐν χειμῶνι προστεταγμένον

μένειν δίκαιον κἀγαθὸν παραστάτην.
ἀναρχίας δὲ μεῖζον οὐκ ἔστιν κακόν.
αὕτη πόλεις τ' ὄλλυσιν. ἥδ' ἀναστάτους
οἴκους τίθησιν· ἥδε συμμάχου δορὸς
τροπὰς καταρρήγνυσι. τῶν δ' ὀρθουμένων
σῴζει τὰ πολλὰ σώματ' ἡ πειθαρχία.

(4) βωμοὶ γὰρ ἡμῖν ἐσχάραι τε παντελεῖς
πλήρεις ὑπ' οἰωνῶν τε καὶ κυνῶν βορᾶς
τοῦ δυσμόρου πεπτῶτος Οἰδίπου γόνου.
κἄτ' οὐ δέχονται θυστάδας λιτὰς ἔτι
θεοὶ παρ' ἡμῶν οὐδὲ μηρίων φλόγα,
οὐδ' ὄρνις εὐσήμους ἀπορροιβδεῖ βοάς,
ἀνδροφθόρου βεβρῶτες αἵματος λίπος.
ταῦτ' οὖν, τέκνον, φρόνησον. ἀνθρώποισι γὰρ
τοῖς πᾶσι κοινόν ἐστι τοὐξαμαρτάνειν·
ἐπεὶ δ' ἁμάρτῃ, κεῖνος οὐκέτ' ἐστ' ἀνὴρ
ἄβουλος οὐδ' ἄνολβος, ὅστις ἐς κακὸν
πεσὼν ἀκεῖται μηδ' ἀκίνητος πέλει.

B.—THUCYDIDES, VI.

(1) Καὶ ὁ μὲν Ἑρμοκράτης τοσαῦτα εἶπε. τῶν δὲ Συρακοσίων ὁ δῆμος ἐν πολλῇ πρὸς ἀλλήλους ἔριδι ἦσαν, οἱ μὲν ὡς οὐδενὶ ἄν τρόπῳ ἔλθοιεν οἱ Ἀθηναῖοι, οὐδ' ἀληθῆ ἐστὶν ἃ λέγοιτο, οἱ δέ, εἰ καὶ ἔλθοιεν, τί ἂν δράσειαν αὐτοὺς ὅτι οὐκ ἂν μεῖζον ἀντιπάθοιεν; ἄλλοι δὲ καὶ πάνυ καταφρονοῦντες ἐς γέλωτα ἔτρεπον τὸ πρᾶγμα. ὀλίγον δ' ἦν τὸ πιστεῦον τῷ Ἑρμοκράτει καὶ φοβούμενον τὸ μέλλον.

(2) Τοιούτῳ μὲν τρόπῳ δι' ἐρωτικὴν λύπην ἥ τε ἀρχὴ τῆς ἐπιβουλῆς καὶ ἡ ἀλόγιστος τόλμα ἐκ τοῦ παραχρῆμα περιδεοῦς Ἁρμοδίῳ καὶ Ἀριστογείτονι ἐγένετο. τοῖς δ' Ἀθηναίοις χαλεπωτέρα μετὰ τοῦτο ἡ τυραννὶς κατέστη, καὶ ὁ Ἱππίας διὰ φόβου ἤδη μᾶλλον ὢν τῶν τε πολιτῶν πολλοὺς ἔκτεινε καὶ πρὸς τὰ ἔξω ἅμα διεσκοπεῖτο, εἴ ποθεν ἀσφάλειάν τινα ὁρῴη μεταβολῆς γενομένης ὑπάρχουσάν οἱ.

(3) καὶ παρελθὼν αὐτοῖς Ἑρμοκράτης ὁ Ἕρμωνος. ἀνὴρ καὶ ἐς τἆλλα ξύνεσιν οὐδενὸς λειπόμενος, καὶ κατὰ τὸν πόλεμον ἐμπειρίᾳ τε ἱκανὸς γενόμενος καί ἀνδρείᾳ ἐπιφανής, ἐθάρσυνέ τε οὐκ εἴα τῷ γεγενημένῳ ἐνδιδόναι· τὴν μὲν γὰρ γνώμην αὐτῶν οὐχ ἡσσῆσθαι, τὴν δὲ ἀταξίαν βλάψαι. οὐ μέντοι τοσοῦτόν γε λειφθῆναι ὅσον εἰκὸς εἶναι, ἄλλως τε καὶ τοῖς πρώτοις τῶν Ἑλλήνων ἐμπειρίᾳ, ἰδιώτας ὡς εἰπεῖν χειροτέχναις, ἀνταγωνισαμένους.

(4) ὥστε καὶ τἀνθάδε εἰκὸς πρὸς τὸ λυσιτελοῦν, καὶ, ὃ λέγομεν, ἐς Συρακοσίους δέος καθίστασθαι. ἀρχῆς γὰρ ἐφίενται ὑμῶν καὶ βούλονται ἐπὶ τῷ ἡμετέρῳ ξυστήσαντες ὑμᾶς ὑπόπτῳ, βίᾳ ἢ καὶ κατ' ἐρημίαν, ἀπράκτων ἡμῶν ἀπελθόντων, αὐτοί ἄρξαι τῆς Σικελίας. ἀνάγκη δέ, ἢν ξυστῆτε πρὸς αὐτούς· οὔτε γὰρ ἡμῖν ἔτι ἔσται ἰσχὺς τοσαύτη ἐς ἣν ξυστᾶσα εὐμεταχείριστος, οὔθ' οἵδ' ἀσθενεῖς ἂν ἡμῖν μὴ παρόντων πρὸς ὑμᾶς εἶεν.

C.—Plato, Selections.

(1) Ἔπειτα, ὦ Λυσίμαχε, οὐ πάνυ ὀλίγοις ἐγὼ τούτων παραγέγονα ἐν αὐτῷ τῷ ἔργῳ, καὶ ὁρῶ οἷοί εἰσιν. ἔξεστι δὲ καὶ αὐτόθεν ἡμῖν σκέψασθαι· ὥσπερ γὰρ ἐπίτηδες οὐδεὶς πώποτ' εὐδόκιμος γέγονεν ἐν τῷ πολέμῳ ἀνὴρ τῶν τὰ ὁπλιτικὰ ἐπιτηδευσάντων. καίτοι εἴς γε τἆλλα πάντα ἐκ τούτων οἱ ὀνομαστοὶ γίγνονται, ἐκ τῶν ἐπιτηδευσάντων ἕκαστα· οὗτοι δ', ὡς ἔοικε, παρὰ τοὺς ἄλλους οὕτω σφόδρα εἰς τοῦτο δεδυστυχήκασιν.

(2) πέπονθα δὲ πρὸς τοῦτον μόνον ἀνθρώπων, ὃ οὐκ ἄν τις οἴοιτο ἐν ἐμοὶ ἐνεῖναι, τὸ αἰσχύνεσθαι ὀντινοῦν· ἐγὼ δὲ τοῦτον μόνον αἰσχύνομαι. ξύνοιδα γὰρ ἐμαυτῷ ἀντιλέγειν μὲν οὐ δυναμένῳ ὡς οὐ δεῖ ποιεῖν ἃ οὗτος κελεύει, ἐπειδὰν δὲ ἀπελθω, ἡττημένῳ τῆς τιμῆς τῆς ὑπὸ τῶν πολλῶν, δραπετεύω οὖν αὐτὸν καὶ φεύγω, καὶ ὅταν ἴδω, αἰσχύνομαι τὰ ὡμολογημένα. καὶ πολλάκις μὲν ἡδέως ἂν ἴδοιμι αὐτὸν μὴ ὄντα ἐν ἀνθρώποις· εἰ δ' αὖ τοῦτο γένοιτο, εὖ οἶδα ὅτι

πολὺ μεῖζον ἂν ἀχθοίμην· ὥστε οὐκ ἔχω ὅ τι χρήσομαι τούτῳ τῷ ἀνθρώπῳ.

(3) Ὡς ἄτοπον, ἔφη, ὦ ἄνδρες, ἔοικέ τι εἶναι, τοῦτο, ὃ καλοῦσιν οἱ ἄνθρωποι ἡδύ· ὡς θαμμασίως πέφυκε πρὸς τὸ δοκοῦν ἐναντίον εἶναι, τὸ λυπηρόν, τῷ ἅμα μὲν αὐτὼ μὴ ἐθελειν παραγίγνεσθαι τῷ ἀνθρώπῳ, ἐὰν δέ τις διώκῃ τὸ ἕτερον καὶ λαμβάνῃ, σχεδόν τι ἀναγκάζεσθαι λαμβάνειν καὶ τὸ ἕτερον, ὥσπερ ἐκ μιᾶς κορυφῆς συνημμένω δύ' ὄντε.

(4) Νὴ τὴν Ἥραν, καλή γε ἡ καταγωγὴ. ἥ τε γὰρ πλάτανος αὕτη μάλ' ἀμφιλαφής τε καὶ ὑψηλή, τοῦ τε ἄγνου τὸ ὕψος καὶ τὸ σύσκιον πάγκαλον, καὶ ὡς ἀκμὴν ἔχει τῆς ἄνθης, ὡς ἂν εὐωδέστατον παρέχοι τὸν τόπον. ἥ τε αὖ πηγὴ χαριεστάτη ὑπὸ τῆς πλατάνου ῥεῖ μάλα ψυχροῦ ὕδατος, ὥστε γε τῷ ποδὶ τεκμήρασθαι·

GREEK COMPOSITION AND TRANSLATION AT SIGHT.

WEDNESDAY, SEPT. 16TH:—AFTERNOON, 2.30 TO 5.30.

1. Translate into English:—

(α) Ἐκεῖνος γὰρ, ὦ ἄνδρες Ἀθηναῖοι λέγεται, πρὸς πατρὸς μὲν Ἀλκμεωνιδῶν εἶναι (τούτους δέ φασιν ὑπὸ τῶν τυράννων ὑπὲρ τοῦ δήμου στασιάζοντας ἐκπεσεῖν, καὶ δανεισαμένους χρήματ' ἐκ Δελφῶν ἐλευθερῶσαι τὴν πόλιν καὶ τοὺς Πεισιστράτου παῖδας ἐκβαλεῖν), πρὸς δὲ μητρὸς Ἱππονίκου καὶ ταύτης τῆς οἰκίας, ἧς ὑπάρχουσι πολλαὶ καὶ μεγάλαι πρὸς τὸν δῆμον εὐεργεσίαι. οὐ μόνον δὲ ταῦθ' ὑπῆρχεν αὐτῷ, ἀλλὰ καὶ αὐτὸς ὑπὲρ τοῦ δήμου θέμενος τὰ ὅπλα δὶς μὲν ἐν Σάμῳ, τρὶς δ' ἐν αὐτῇ τῇ πόλει, τῷ σώματι τὴν εὔνοιαν, οὐ χρήμασιν οὐδὲ λόγοις ἐνεδείξατο τῇ πατρίδι. ἔτι δὲ ἵππων Ὀλυμπίασιν ἀγῶνες ὑπῆρχον αὐτῷ καὶ νῖκαι, καὶ στρατηγὸς ἄριστος, καὶ λέγειν ἐδόκει πάντων, ὥς φασιν, εἶναι δεινότατος. ἀλλ' ὅμως οἱ κατ

ἐκεῖνον ὑμέτεροι πρόγονοι οὐδενὸς τούτων αὐτῷ συνεχώρησαν ὑβρίζειν αὐτοὺς ἀλλὰ ποιήσαντες φυγάδα ἐξέβαλον, καὶ Δακεδαιμονίων ὄντων ἰσχυρῶν τότε καὶ Δεκελειαν ἑαυτοῖς ἐπιτειχισθῆναι καὶ τὰς ναῦς ἁλῶναι καὶ πάντα ὑπέμειναν, ὁτιοῦν ἄκοντες παθεῖν κάλλιον εἶναι νομίζοντες ἢ ἑκόντες ὑβρίζεσθαι συγχωρῆσαι.

(*b*) ὦ παγκακίστη καὶ φίλων διαφθορεῦ.
οἷ' εἰργάσω με. Ζεύς σε γεννήτωρ ἐμὸς
πρόρριζον ἐκτρίψειεν οὐτάσας πυρί.
οὐκ εἶπον οὐ σῆς προὐνοησάμην φρενός,
σιγᾶν ἐφ' οἷσι νῦν ἐγὼ κακύνομαι ;
σὺ δ' οὐκ ἀνέσχου. τοιγὰρ οὐκέτ' εὐκλεεῖς
θανούμεθ'. ἀλλὰ δεῖ με δὴ καινῶν λόγων.
οὗτος γὰρ ὀργῇ συντεθηγμένος φρένας
ἐρεῖ καθ' ἡμῶν πατρὶ σὰς ἁμαρτίας,
ἐρεῖ δὲ Πιτθεῖ τῷ γέροντι συμφοράς,
πλήσει τε πᾶσαν γαῖαν αἰσχίστων λόγων.
ὅλοιο καὶ σὺ χὥστις ἄκοντας φίλους
προθυμός ἐστι μὴ καλῶς εὐεργετεῖν.

2. Translate into Greek:—

The foreign lords of Bengal were naturally objects of hatred to all the neighbouring powers, and to all the haughty race presented a dauntless front. Their armies, everywhere outnumbered, were everywhere victorious. "It must be acknowledged," says the Mussulman historian of those times, "that this nation's presence of mind, firmness of temper, and undaunted bravery, are past all question. They join the most resolute courage to the most cautious prudence; nor have they their equal in the art of ranging themselves in battle array and fighting in order. If to so many military qualifications they knew how to join the arts of government—if they exerted as much ingenuity and solicitude in relieving the people of God as they do in whatever concerns their military affairs, no nation in the world would be preferable to them or worthier of command: but the people under their dominion groan everywhere and are reduced to poverty and distress. O God! come to the assistance of thine afflicted servants, and deliver them from the oppression they suffer."

LATIN.

WEDNESDAY, SEPT. 9TH:—MORNING, 9 TO 12.

I. HORACE, EPISTLES, BOOK I.

1. Translate:

(*a*) Ep. II., vss. 59-67.
(*b*) Ep. VI., vss. 49-55.
(*c*) Ep. XI., vss. 25-30.
(*d*) Ep. XIX., vss. 6-14.

2. Write brief notes on: (*a*) Ianus summus ab imo; (*b*) curatus inaequali tonsore; (*c*) di tibi divitias dederunt artemque fruendi (scan); (*d*) ait esse paratus; (*e*) leges iuraque; imus lectus; haec tibi *dictabam* post fanum putre *Vacunae excepto* quod non simul *esses*, *cetera* laetus (remark on words italicized); quo mihi fortunam si non conceditur uti? (What other reading has good Ms. authority? Discuss the syntax and metre in case of either reading.).

II. CICERO'S LETTERS (TYRRELL).

3. Translate, with brief comments:

(*a*) Apud matrem recte est, eaque nobis curae est. L. Cincio HS XXCD constitui me curaturum Idibus Februariis. Tu velim ea, quae nobis emisse te et parasse scribis, des operam ut quam primum habeamus, et velim cogites, id quod mihi pollicitus es, quem ad modum bibliothecam nobis conficere possis. Omnem spem delectationis nostrae, quam, cum in otium venerimus, habere volumus, in tua humanitate positam habemus.

(*b*) Roma et maxime . . . et Appia ad Martis mira alluvies; Crassipedis ambulatio ablata, horti, tabernae plurimae, magna vis aquae usque ad piscinam publicam. Viget illud Homeri:

Ἦματ' ὀπωρινῷ. ὅτε λαβρότατον χέει ὕδωρ
Ζεύς, ὅτε δή ῥ' ἄνδρεσσι κοτεσσάμενος χαλεπήνῃ.

Cadit enim in absolutionem Gabinii:

Οἳ βίῃ εἰν ἀγορῇ σκολιὰς κρίνωσι θεμιστας,
Ἐκ δὲ δίκην ἐλάσωσι, θεῶν ὄπιν οὐκ ἀλέγοντες.

Sed haec non curare decervi. Roman cum venero, quae perspexero, scribam ad te et maxime de dic-

tatura, et ad Labienum et ad Ligurium litteras dabo. Hanc scripsi ante lucem ad lychnuchum ligneolum, qui mihi erat periucundus, quod eum te aiebant, cum esses Sami, curasse faciendum. Vale, mi suavissime et optime frater.

(*c*) Quod ad Caesarem, crebri et non belli de eo rumores, sed susurratores dumtaxat veniunt: alius equitem perdidisse, quod, opinor, certe fictum est: alius septimam legionem vapulasse, ipsum apud Bellovacos circumsederi interclusum ab reliquo exercitu: neque adhuc certi quidquam est neque haec incerta tamen vulgo iactantur, sed inter paucos, quos tu nosti, palam secreto narrantur: at Domitius, cum manus ad os apposuit.

4. Explain the following words and phrases: (*a*) diplomate; (*b*) ne in quartam hebdomada incideres; (*c*) Iovem lapidem iurare; (*d*) indices; (*e*) exhedrae.

III. VIRGIL, AENEID, BK. IX.

5. Translate:

(*a*) vss. 25-31.
(*b*) vss. 295-302.
(*c*) vss. 525-529.

6. Write explanatory notes on the following lines: 9 (also scan); 41 (also scan); 140-141, 315; 527-528; 656; 789.

III. SALLUST, CATILINE.

7. Translate with notes on italicized words:

(*a*) Igitur *senati* decreto, Q. Marcius Rex *Faesulas*, Q. Metellus Creticus in Apuliam *circumque ea loca* missi; hi utrique *ad urbem imperatores* erant; impediti, ne triumpharent, calumnia paucorum, quibus omnia honesta atque inhonesta vendere mos erat.

(*b*) Tum D. Junius Silanus, primus sententiam rogatus, quod eo tempore consul designatus erat, de his, qui in custodiis tenebantur, praeterea de L. Cassio, P. Furio, si *deprehensi forent*, supplicium *sumundum* decreverat; isque postea, permotus oratione Caesaris, *pedibus in sententiam Tib. Neronis* iturum se dixerat, quod de ea re praesidiis additis referundum censerat.

LATIN.

WEDNESDAY, SEPT. 9TH:—AFTERNOON, 2.30 TO 5.30.

1. Translate into English:—

Erat in castris Percennius quidam, dux olim theatralium operarum, dein gregarius miles, procax lingua et miscere coetus histrionali studio doctus. Is imperitos animos, et quaenam post Augustum militiae condicio ambigentes impellere paulatim nocturnis colloquiis aut flexo in vesperam die, et dilapsis melioribus deterrimum quemque congregare. Postremo promptis iam et aliis seditionis ministris, velut contionabundus interrogabat: cur paucis centurionibus, paucioribus tribunis, in modum servorum obedirent? quando ausuros exposcere remedia, nisi novum et nutantem adhuc principem precibus vel armis adirent? satis per tot annos ignavia peccatum, quod tricena aut quadragena stipendia senes, et plerique truncato ex volneribus corpore tolerent: ne dimissis quidem finem esse militiae, sed apud vexillum retentos alio vocabulo eosdem labores perferre: ac si quis tot casus vita superaverit, trahi adhuc diversas in terras ubi per nomen agrorum uligines paludum vel inculta montium accipiant. Enimvero militiam ipsam gravem infructuosam: denis in diem assibus animam et corpus aestimari: hinc vestem arma tentoria, hinc saevitiam centurionum et vacationes munerum redimi: at hercule verbera et volnera, duram hiemem, exercitas aestates, bellum atrox aut sterilem pacem sempiterna: nec aliud levamentum quam si certis sub legibus militia iniretur; ut singulos denarios mererent; sextusdecimus stipendii annus finem afferret; ne ultra sub vexillis tenerentur, sed eisdem in castris praemium pecunia solveretur. An praetorias cohortes, quae binos denarios acceperint, quae post sedecim annos penatibus suis reddantur, plus periculorum suscipere? Non obtrectari a se urbanas excubias: sibi tamen apud horridas gentes e contuberniis hostem adspici.

2. Translate into Latin:

Archias was born at Antioch and was remarkable from boyhood for his ability and skill in writing. After travelling throughout Asia, where he enjoyed great fame as a poet, he came to Rome in the year 102 B. C. Not long before he had received great

rewards for his poetry in the cities of Southern Italy. He was still a young man, and yet he was at once received as an intimate friend by the Luculli. He was also the friend of Cicero, who defended him when he was accused of having illegally obtained Roman citizenship. In the first part of his speech Cicero said that he owed to Archias all the powers of intellect and oratory he possessed, for the latter had been his chief guide in the pursuit of all the branches of literature.

A.—History.

THURSDAY, SEPT. 10TH:—MORNING, 9 TO 12.

Write A. and B. in separate books.

1. What is the origin of the myths of the regal period, and to what causes may their growth be ascribed. What is *Euhemerism?*

2. State briefly what you know of Spurius Maelius, Papirius Cursor, Curius Dentatus, Appius Claudius Caecus.

3. Give the chief events from January 1, B.C. 43 to the death of Brutus.

4. Sketch the early career of Pyrrhus, and his schemes to found an Hellenic empire in the West.

5. Describe the main causes which led to the fall of the Republic.

B.—Greek History.

6. Give a detailed account of the reforms of Cleisthenes? Summarize the general effect of these.

7. Give as complete a list as you can of the revolts of Athenian allies between 470 B.C., and 410 B.C., with dates.

Compare the position of Athens as head of her allies with that of Sparta, as the leading power of the Peloponnese. Discuss the elements of insecurity in each.

8. Discuss (*a*) the influence on the result of Cimon, Brasidas, Cleon, Alcibiades, Thrasybulus; (*b*) the importance of the alliance with Megara.

9. With what events are the following names associated? — Naupactus, Eurymedon, Oenophyta, Ithome, Delium, Leuctra. Give dates and indicate the effects of these events on the general course of Greek History.

10. Discuss the advantages and disadvantages of election by lot.

ENGLISH LITERATURE.

SHAKESPERE: *The Tempest;* MILTON, *Paradise Lost, I. and II.*

FRIDAY, SEPT. 11TH:—MORNING, 9 TO 12.

1. Point out, with the help of specific illustrations, the great merit of *The Tempest* as a close and coherent dramatic composition.

2. Give your impression of the character of Caliban; quote in support of your view.

3. Give examples, from *The Tempest*, in illustration of the following points:—skilful and accurate use of nautical terms, precise and graphic poetic expression, expressions indicative of individual character, Shakspere's knowledge of contemporary events.

4. Point out, with the help of examples, Milton's inventiveness in imagery and comparison. Quote as accurately as possible.

5. Give a summary of:—The building of the Infernal Palace, the disposition of Belial as revealed through his counsels.

6. What terms does Milton use to describe the many-sided character of Satan? Dwell on the appositeness of the expressions employed.

7. What proof may be found in *Paradise Lost, I. and II.* (*a*) that Milton had a wide knowledge of the ancient classics, (*b*) that his sense of harmony and rhythm in verse was exceptionally keen?

8. Write a short dissertation on the principal literary sources of *either* The Tempest or Paradise Lost.

ENGLISH LITERATURE AND COMPOSITION.

FRIDAY, SEPT. 11TH:—AFTERNOON, 2.30 TO 5.30.

A.—CHARLES LAMB: *Essays of Elia.*

1. What is meant by the phrase "Charles Lamb's quaint and original turn for paradox?" Illustrate fully.
2. What may be inferred from the *Essays of Elia* concerning Lamb's literary preferences and dislikes? Give ample illustration.
3. Discuss Lamb's professed view in the essay "On the Artificial Comedy of the Last Century."
4. Make notes on the following:—Lamb's varied and expressive vocabulary, the character of James Elia, the pathetic strain in the *Essays of Elia.*
5. Wherein lies the special originality of Charles Lamb's literary style?
6. Note autobiographical details in the *Essays of Elia,* and point out the difficulty of authenticating them.

B.—COMPOSITION.

Write an essay on any *one* of the following subjects:

a. Satan, the Hero of Paradise Lost.
b. The Partition of Poland.
c. The Universality of Shakspere's Genius.

HISTORY.

MYERS' *Mediaeval and Modern History, Part I.*

TUESDAY, SEPT. 15TH:—AFTERNOON, 2.30 TO 5.30.

1. Sketch the reign of Justinian.
2. Mention the chief stages in the spread of Mohammedanism.
3. What are the main aspects of mediaeval Chivalry?
4. Outline the leading episodes of:
   (*a*) The Second Crusade;
   (*b*) The Children's Crusade.
5. Write as detailed an account as you can of the origin of the Ottoman Turks, and of their fortunes until 1500.
6. Emphasize the main features of intellectual life during the Middle Ages.

7. Make brief notes on:

The Council of Whitby; the battle of Nineveh (627); the golden age of the Caliphate; the Iconoclastic Controversy; the Normans in Italy; the Mendicant Orders; the Hanseatic League; the invention of printing; Piers Plowman; the Trouveurs.

FRENCH.

MONDAY, SEPT. 14TH:—MORNING, 9 TO 12.

I. Faire une analyse de *La Nuit de Mai;* en citer quelques vers

ou

Ecrire une courte esquisse biographique de la vie de Musset.

II. Montrer la supériorité de l'exposition *ou* raconter l'intrigue du *Tartuffe.*

III. La légende d'Iphigénie dans l'antiquité.

ou

Le caractère et le rôle d'Eriphyle.

ou

Le caractère d'Agamemnon.

IV. Traduire en français:

Alexander the Great, one of the most famous generals who have ever lived, died at Babylon. He was on the point of turning his victorious arms against the nations of the West, when he had to leave the scene of the greatest victories which the world had yet seen. It has been remarked that he was born on the day that the temple of Ephesus was burnt, and that he died on the same day as Diogenes, the cynic, one of the most eccentric personages who have arrogated to themselves (*s'arroger*) the title of philosopher. Although his life was short, he had proved himself a great warrior, and his fame had spread throughout the whole world. He died before he had had the opportunity of showing that he possessed the qualities of a great ruler, as well as those of a great general. There is no one who has read the story of his life without wishing that he had lived to develop his genius in the arts of peace. One does not believe that history can offer a stranger mixture of simplicity, force of character, and ambition.

GERMAN.

MONDAY, SEPT. 14TH:—AFTERNOON, 2.30 TO 5.30.

I. Translate into English:—

(*a*) Ob nun gleich die meisten sich dieser wichtigen, in der Ferne vorgehenden Ereignisse nur zu einer leidenschaftlichen Unterhaltung bedienten, so waren doch auch andere, welche den Ernst dieser Zeiten wohl einsahen und befürchteten, daß bei einer Teilnahme Frankreichs der Kriegsschauplatz sich auch in unsern Gegenden aufthun könne. Man hielt uns Kinder mehr als bisher zu Hause, und suchte uns auf mancherlei Weise zu beschäftigen und zu unterhalten. Zu solchem Ende hatte man das von der Großmutter hinterlassene Puppenspiel wieder aufgestellt, und zwar dergestalt eingerichtet, daß die Zuschauer in meinem Giebelzimmer sitzen, die spielenden und dirigierenden Personen aber, sowie das Theater selbst vom Proscenium an, in einem Nebenzimmer Platz und Raum fanden. Durch die besondere Vergünstigung, bald diesen bald jenen Knaben als Zuschauer einzulassen, erwarb ich mir anfangs viele Freunde; allein die Unruhe, die in den Kindern steckt, ließ sie nicht lange geduldige Zuschauer bleiben.

(*b*) Westphalen bestund aus einzelnen Höfen, deren jeder einen eigentümlichen und freien Besitzer hatte. Mehrere solcher Höfe machten eine Bauerschaft aus, die Gewöhnlich den Namen des ältesten und vornehmsten Hofes führte. Es gründet sich in der ersten Anlage der Bauerschaften, daß der älteste Hof auch der erste im Range bleiben und der vornehmere werden mußte, wo von Zeit zu Zeit die davon ausgegangenen Kinder, Enkel, Hausgenossen zusammenkamen und einige Tage feierten und zechten. Der Anfang oder das Ende des Sommers war die gewöhnliche Zeit dazu, wo jeder Hofbesitzer etwas von seinen gezogenen Früchten und auch wohl ein junges Stück Vieh zum Bauermahl mitbrachte. Man besprach sich über mannigfaltige Gegenstände und nahm Rücksprache, Heiraten wurden da geschlossen, Todesfälle angezeigt, und der Sohn als eingetretenes Haupt seines väterlichen Erbes erschien dann gewiß mit volleren Händen und

ausgesuchterem Viehe bei seinem ersten Eintritt in die Versammlung.

II. Translate into English (at sight):

Der Bauer that alles, wie ihm geheißen worden war. Als er nun ein wenig gedoktert hatte, geschah es, daß einem reichen großen Herrn Geld gestohlen wurde. Da hörte derselbe von dem Doktor Allwissend, der in dem und dem Dorfe wohne und wissen müsse, wo das Geld hingekommen sei. Also ließ der Herr seinen Wagen anspannen, fuhr nach dem Dorf und dem Haus es Doktors, und fragte ihn, ob er der Doktor Allwissend wäre. Der Bauer antwortete: „Ja, der bin ich." Da forderte ihn der Herr auf, gleich mitzugehen und das gestohlene Geld wiederzuschaffen, und er war auch sofort dazu bereit und sagte: „Schon echt, aber meine Frau, die Grete, muß auch mit." Der Herr hatte nichts dagegen, ließ beide in den Wagen steigen und fuhr nach Hause zurück.

III. Translate into German:

(*a*) A merchant met a sailor, and had a conversation with him. Among other things he asked him where his father died. The sailor answered: "My father, my grandfather and great-grandfather all died on the sea." "And are you not afraid to go upon the water?" asked the merchant again. The sailor replied to this: "Will you tell me, please, where your ancestors died?" "They all died in their beds," said the merchant, "like good Christians." "Now then," said the sailor, "your ancestors all died in bed, and you are not afraid to go to bed, and am I to be afraid to go to sea, because my ancestors died there?"

(*b*) If I had known that you were coming I should have gone to meet you.

I have been asked to be present at the meeting; I have heard that you are to read something.

IV. Give a full account of the period in Schiller's life which *Don Carlos* belongs.

V. Write about the less frequently met classes of "separable" and "inseparable" compound verbs.

ECONOMICS AND POLITICAL SCIENCE.

Elements of Political Science.

Tuesday, Sept. 15th:—Morning, 9 to 12.

1. Give a summary of Seeley's discussion of "Government by One."

[First Series, Lecture VIII.]

2. "Primitive society rested not upon contract, but on status." Explain.

3. Discuss (after Wilson), the nature of International Law.

4. Give Wilson's classification of the functions of Government with some of his leading subdivisions.

5. Write a short paper on the Origin of the State.

ECONOMICS AND POLITICAL SCIENCE.

Constitution and Government of England.

Tuesday, Sept. 15th:—Afternoon, 2.30 to 5.30.

1. Accurately explain the composition of the House of Lords.

2. (*a*) Can a Statute of Parliament constitute a violation of the English Constitution? Give reasons for your answer.

(*b*) Distinguish between the Law and the Custom of the English Constitution.

3. Discuss (after Burgess) the tenure of the British Crown.

4. Define the extent of the jurisdiction of the House of Lords as a court.

ECONOMICS AND POLITICAL SCIENCE.

Elements of Economic Theory, I.

Monday, Sept. 14th:—Morning, 9 to 12.

(*Omit one of the questions.*)

1. Walker names three "obstacles which Political Economy encounters." Enumerate and discuss them.

2. What is understood by "capital"? What is its origin and from what sources is it increased? What are its chief forms?

3. Show how changes in the supply of a commodity influence its value, giving illustrations.

4. Why is the problem of value in international exchanges discussed on different lines to those followed for value in domestic exchanges?

5. Show how the development of American food production has operated on land-rents in England.

6. State Walker's view as to the labourer being the residual claimant to the product of industry, and compare it with the doctrine of the Wages Fund.

7. What are the chief advantages which cooperative industry may offer the labouring classes and the community in general?

ECONOMICS AND POLITICAL SCIENCE.

Elements of Economic Theory, II.

Monday, Sept. 14th:—Afternoon, 2.30 to 5.30.

(*Omit one of the questions.*)

1. Show how different rates of interest may, apparently, coexist in the same market. What further causes may lead to different rates in different markets?

2. Discuss the influences which determine the value of money, giving especial attention to the influences connected with credit.

3. What change, if any, is made in the value of money by the exaction of seigniorage? What relation is there between debasement of coin and its depreciation?

4. Explain what is meant by over-production and by under-consumption, and discuss their relation to hard times.

5. Describe the National Banking System of the United States, especially in its relation to the currency, and sketch briefly its origin and growth.

6. Summarize Walker's discussion of the views of Henry George, and state the leading points in which he claims to refute those views.

7. What different bases for the assessment of the amount of taxation a citizen should pay have been proposed? Is progressive taxation justifiable?

ECONOMICS AND POLITICAL SCIENCE.

The History of Economic Theory.

Wednesday, Sept. 16th:—Morning, 9 to 12.

(*Omit one of the questions.*)

1. Explain what Adam Smith meant by the "system of natural liberty," and state the cases in which he commends legal restraint on individual liberty, giving his reasons for each such exception

2. State the view, expressed by Malthus, of what is now known as the law of diminishing returns. Show how this law, in connection with the conditions prevailing in England at the end of the eighteenth century, suggests the conclusion embodied in Malthus' second proposition.

3. How did Ricardo come to write on economic theory, and what defects are most conspicuous in his mode of exposition? Show the relation between Ricardo's theory of value and that of Marx, as also the difference between them.

4. State and criticise Mill's exposition of the relation of cost of production to value.

5. Discuss the position in economic investigation of the methods of deduction and induction respectively explaining the general nature of these methods as applied to economics.

6. State the explanation given by Bagehot of "Why Lombard Street is often very dull and sometimes extremely excited."

7. Give a brief account of Jevons' work in economic statistics.

EXHIBITION AND PRIZE

EXAMINATIONS

FACULTY OF APPLIED SCIENCE

EXHIBITION AND PRIZE EXAMINATIONS

SECOND YEAR EXHIBITION AND PRIZE EXAMINATION, 1903.

MATHEMATICS.

SATURDAY, SEPT. 19TH:—MORNING, 9 TO 12.30.

1. Given the base and vertical angle of a triangle, find the locus of the intersection of the bisectors of its angles.

2. The sides of a triangle are 5, 6, 7; find the length of the bisector of the angle between the sides whose lengths are 5 and 7.

3. A parabola being traced on paper, find its focus and axis.

4. Find a point in a given plane such that the sum of its distances from two given points, not in the plane but on the same side of it, may be a minimum.

5. If a, b, c are in G. P. and $a^p = b^q = c^r$, then p, q and r are in H.P.

6. The equation $(x^2 - bx)(m + 1) = (m - 1)(ax - c)$ has roots equal in magnitude and opposite in sign; find m.

7. Show that the coefficient of x^r in the expansion of $(1 - 4x)^{-\frac{1}{2}}$ is $\frac{\lfloor 2r}{(\lfloor r)^2}$

8. Assuming $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$ when n is a positive integer, prove it is true when n is fractional or negative.

9. Show that $\tan^{-1} x - \tan^{-1} y = \tan^{-1}\frac{1}{y} - \tan^{-1}\frac{1}{x}$

10. If $\sin B$ is the geometric mean between $\sin A$ and $\cos A$ then $\cos 2B = 2\cos^2(A + 45°)$.

11. Prove

(1) $\sin \frac{2\pi}{7} + \sin \frac{4\pi}{7} - \sin \frac{6\pi}{7} =$

$$\sin \frac{\pi}{7} \sin \frac{3\pi}{7} \sin \frac{5\pi}{7}.$$

(2) $1 + \tan a \tan \frac{1}{2} a = \sec a.$

12. Solve the equation $\cos \theta - \sin \theta = \cos a - \sin b$ for all values of θ.

THIRD AND FOURTH YEARS EXHIBITION AND PRIZE EXAMINATION, 1903.

MATHEMATICS.

SATURDAY, SEPT. 19TH:—MORNING, 9 TO 12.30.

1. In any plane triangle

$$da = \cos C\, db + \cos B\, dc + b \sin C\, dA.$$

2. Explain a method, involving differentiation, of obtaining the roots of equations, and find to three decimal places one root of the equation

$$x^5 - 12x = 200.$$

3. The height of the greatest rectangle which can be inscribed in a given right segment of a parabola is two-thirds of the height of the latter.

4. Show that the radius of curvature of the hypocycloid $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ is $3\sqrt[3]{axy}$.

5. Integrate (1) $\frac{1}{x}\sqrt{x^2-a^2}\, dx$, (2) $\frac{2x\,dx}{1+x+x^2+x^3}$

(3) $x \tan^2 x dx.$

6†. Obtain a formula for the reduction of $\int \cos^n \theta d\theta$.

7. The area of the curve $y^2 = 1 + x^2 y^2$ between $x = -\frac{1}{3}$ and $x = \frac{1}{2}$ revolves about the axis of x. Show that the volume of the solid thus generated is $\pi \log 3$.

8.† Find three terms of the expansion of $e^x \cos x$.

9.* Show how to find the tangent to a parabola, the

tangent making a given angle with a given straight line.

10†. Reduce the conic

$$11x^2 - 12xy + 6y^2 - 8x - 2y - 3 = 0$$

to its principal axes.

11*. Find a new origin such that the equation of the curve of question 10, when referred to parallel axes, shall contain no terms of the first degree.

12*. The normal at any point of an ellipse bisects the angle between the focal radii of the point.

13*. The time of vertical descent from a given point to the centre of a vertical circle is the same as that to the circumference down a tangent.

14*. A body is projected horizontally from a height h with a speed v. Find the equation of its path.

15†. What is meant by the centre of percussion? Explain how its position may be calculated.

16†. A circular disc of 3 in. diameter rolls down from the top of another disc of 12 in. diameter. Prove that the speed of the centre $= 8 \sin \frac{\theta}{2}$, where θ is the angle which the common tangent makes with the horizontal.

* For Third Year only.

† For Fourth Year only.

SCOTT EXHIBITION EXAMINATION.

Summer Readings in English.

Monday, Sept. 21st—Afternoon, 2 to 5.

Candidates are recommended to pay attention to the form as well as the matter, of their answers. Composition and spelling will be taken into account along with knowledge of the books in determining the result.

Only two questions in each section are to be attempted—eight in all.

A.—Shakspere's Henry V.

1. Tell what you know of the date of this play and its connection with Shakspere's personal history.

2. What is the relation of *Henry V.* to the literary and historical conditions of the Elizabethan period?

3. Discuss two of the persons of *Henry V.* as types of national character.

B.—GOLDSMITH'S VICAR OF WAKEFIELD.

4. Write on Goldsmith's relations to the leading men of his time.

5. Outline the character of the Vicar.

6. What portions of the novel probably relate Goldsmith's own experiences?

C.—SCOTT'S WAVERLEY.

7. Write a life of Scott, and give your opinion of his character.

8. Relate Waverley's "nocturnal adventure" and meeting with Charles Edward.

9. Discuss Scott's descriptions of Highland customs and scenery.

D.—STEVENSON'S KIDNAPPED.

10. Give a short account of Stevenson's family and early life.

11. Compare *Kidnapped* with other stories of adventure you have read.

12. Narrate David's experiences on the island of Earraid.

SCOTT EXHIBITION EXAMINATION.

DESCRIPTIVE GEOMETRY.

MONDAY, SEPTEMBER 21ST:—MORNING, 9 TO 12.

1 Draw a considerable portion of the curve described by a point ¼ in. within the circumference of a circle 1½ in. in diameter, when this circle rolls exteriorly on the circumference of a circle whose diameter is 3½ inches.

2 A right prism 3½ in. long, having a pentagonal end, side of pentagon 1 in., penetrates a right vertical cylinder 3 inches long, diameter of end 1¾ in., so that their axes bisect each other at right angles. Show elevation when a rectangular face of prism is vertical and at 30° to the V.P.

Also give the development of the surface of the prism, showing the section lines.

3 Three points, A, B, and C, are the angles of a triangle. Show the plan and elevation of the triangle, when placed as indicated by the given positions of its angles; also show, by the process of rebattment, the true shape of the triangle.

A is 1″ above H.P., and 1¾″ in front V.P.
B is 2¼″ above H.P., and ¼″ in front V.P.
C is ¼″ above H.P., and ¾″ in front V.P.

The plan of A B is 1 ⅝″ long, and the plan of B C is 1″ long.

4 A right hexagonal pyramid, axis 3 inches, edge of base 1″, rests on one of the edges of its base on the H.P., so that its axis is inclined at 45° to the H.P., and 30° to the V.P. Represent the solid in plan and elevation.

Let a section plane parallel to the V.P. cut through the solid so as to pass through the centre of its base.

Show the development of the surface of the solid (triangular faces and base), and mark the intersection lines made by the section plane.

5 A tetrahedron, edge 2½ in., has one edge at 25° to H.P., and 15° to V.P., and an edge adjacent to this at 40° to H.P. Show plan and elevation.

BRITISH ASSOCIATION EXHIBITION, 1903.

THEORY OF STRUCTURES.

MONDAY, SEPT. 21ST:—MORNING, 9 TO 12.

(Candidates may attempt all the questions.)

1. Define in general terms the meaning of the term *strain*, and show how to apply your definition to obtain a measure of the strain in the case of a body subjected to (*a*) simple longitudinal tension, (*b*) pure shear, (*c*) cubical compression.

2. What is meant by the resilience of a bar?

A bar, 1¼ inches square and 50 inches long, is subjected to a tensile pull of 30,000 pounds. Calculate the work stored up in the bar when E is 31,000,000.

3. State the assumption made in determining the equations for the strength of a transversely loaded beam, and deduce the formulae from these assumptions, showing clearly how these latter modify the equations.

A bar of circular section is bent into an arc of a circle of 750 feet radius. Find the moment of resistance when E is 32,000,000, and find also the greatest stress in the metal.

4. Draw to scale the shearing force and bending moment diagrams for the case of a beam 20 feet long, supported at the ends and loaded with three weights of 3, 2 and 4 tons, at distances of 5, 9, 16 feet respectively from one end. Also determine the shearing force and bending moment diagrams when a further load of ¾ ton per foot run covers the bridge.

5. A plate girder, 6 feet deep and 50 foot span, carries a uniformly distributed load of 3,000 pounds per foot run. Design the central section of this girder when the allowable stress is 14,000 pounds per square inch.

6. Find a general expression for the deflection of a beam at the point of application of the load when the beam is supported at both ends, and hence deduce the deflection for the case where the loading is central.

Determine the deflection at the load point of a round steel rod, 1½ inch in diameter, placed on supports 8 feet apart and loaded with 500 pounds at a distance of 3 feet from one end. $E = 30{,}000{,}000$.

7. Find the deflection at the free end of a cantilever of length l, when loaded with a uniform load of W pounds per foot run and also with a concentrated load of W pounds at the outer end.

8. Obtain the theorem of three moments for the case of a uniform beam with continuous loads of different amounts on adjacent spans.

A continuous girder has three spans of 30, 60 and 40 feet, respectively: it carries a load of 3,000 pounds per foot run and the extreme ends are free. Cal-

culate the bending moments at the intermediate supports, and draw diagrams of bending moment and stress, to scale, for the whole span.

9. Obtain an expression for the intensity of the shear in the cross section of a beam in the form $V = \frac{S}{wI} A$ and hence show how the shearing stress is distributed in a beam of rectangular section.

10. Show that a hollow shaft is both stiffer and stronger than a solid shaft of the same weight and length, and explain what objections have been urged against the employment of hollow shafts.

A four inch steel shaft revolves at 140 revolutions per minute and the maximum stress to which it is subjected is 12,000 pounds per square inch. Calculate the number of foot pounds of work transmitted per minute.

11. A steel cylinder, of 3 inches internal diameter and 1¼ inches thick, is subjected to an internal pressure of 3,000 pounds per square inch. Calculate the hoop stress at the inner and outer diameters and at the centre of the cylinder walls.

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